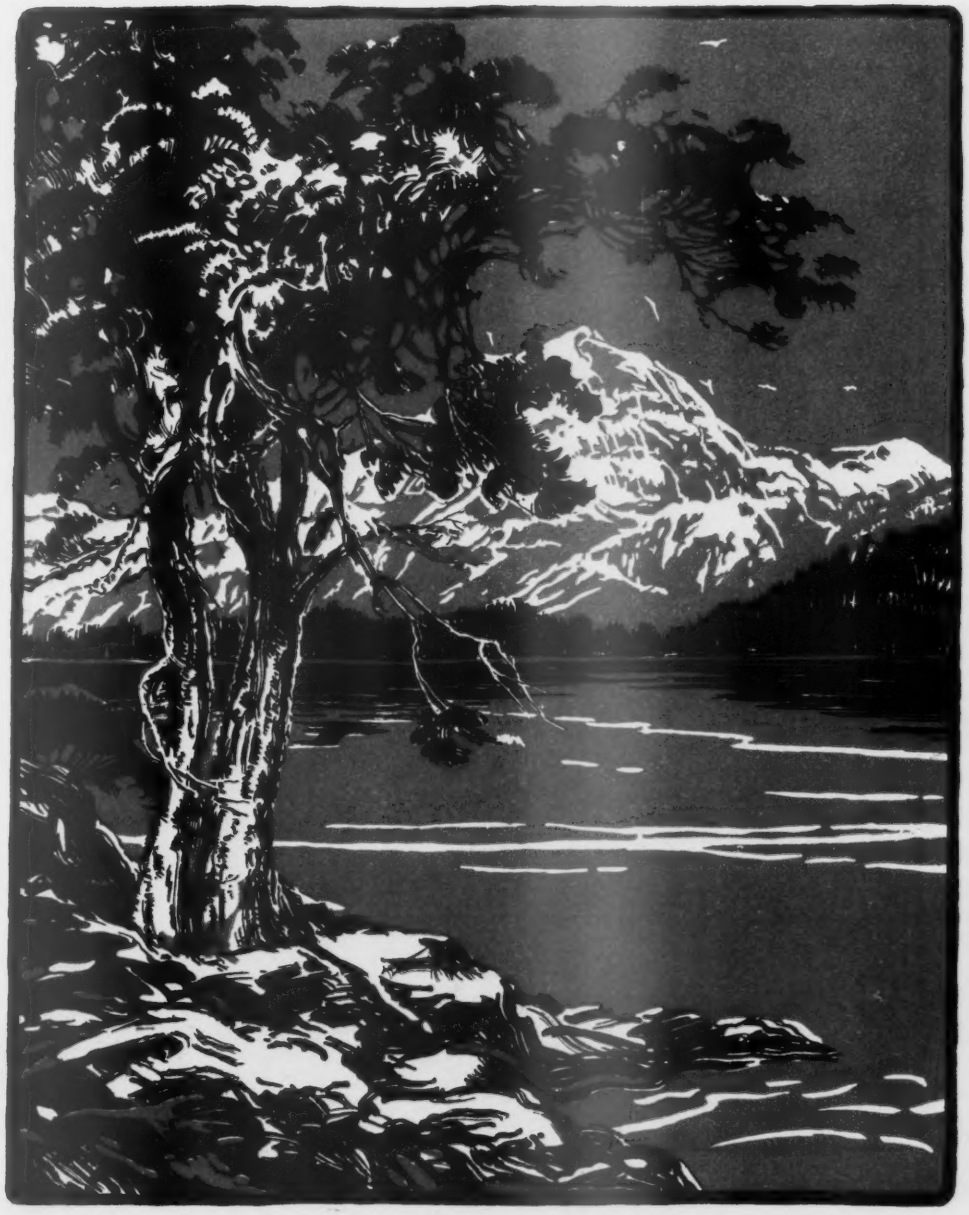
NOTICE TO READER

When you finish reading this magazine, place a 1-cent stamp on this notice, mail the magazine, and it will be placed in the hands of our soldiers or sailors destined to proceed overseas. NO WRAPPING—NO ADDRESS.

A. S. BURLESON, Postmaster General.

VOLUME 24 JUNE, 1918 NUMBER 294

American Forestry



An Illustrated Magazine about Forestry and Kindred Subjects Published Each Month by the American Forestry Association, Washington, D. C

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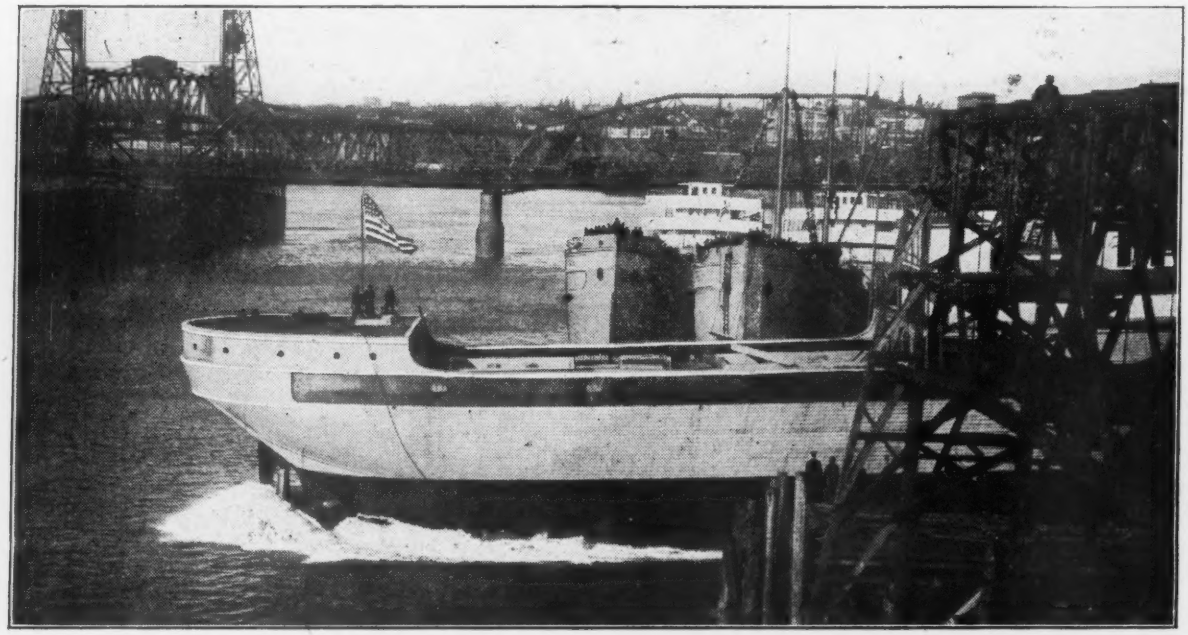

Launching of the Ferris-type wooden S. S. *Harney* at the ship-yards of the Supple and Rallin Shipbuilding Corporation, Portland, Oregon. The partially completed sister ships *Mt. Shasta* and *Mt. Hood* are shown in the background. (*Illustration courtesy of builders.*)

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

JUNE 1918 VOL. 24 CONTENTS No. 294

SUNSET ON THE PACIFIC

This illustrates the important part two eucalypts can play in the making of a picture.

Entered as second-class mail matter December 24, 1909, at the Post-office at Washington, under the Act of March 3, 1879. Copyright, 1918, by the American Forestry Association.

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Committee on Public Information

FALLING A GIANT SPRUCE FOR UNCLE SAM

AMERICAN FORESTRY

VOL. XXIV JUNE, 1918 NO. 294

SPRUCE FOR AIRPLANES—THE EYES OF THE ALLIED ARMIES

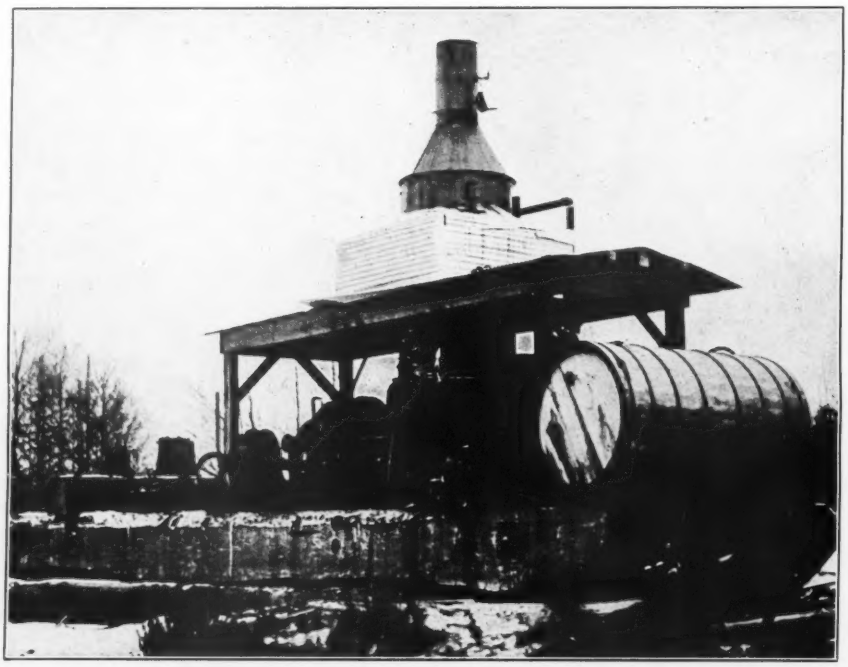
IN no previous conflict has dependence upon wood in warfare been such a tremendous factor or so strikingly illustrated. Competitive substitutes for man's oldest material of artifice were apparently threatening it three years ago, but the supreme test of race preservation has quickly proved there is no substitute. Hereafter will be no uncertainty as to the importance of forest resources and the lumber industry in national efficiency and

Committee on Public Information

STEAM LOGGING, TO GET THE SPRUCE LOGS OUT OF THE FORESTS

This soldier-woodsman is signalling the donkey engineer, in getting out this big fellow. The Spruce Production Division of the Signal Corps is busy clearing our forests of spruce, so necessary in the manufacture of airplanes.

national safety. Housing of armies is no longer in tents, but in wooden cities. Fighting is in wood-lined trenches, heavy artillery is movable only on quickly constructed wooden roads, troops and supplies go over railways requiring millions of ties, and there are countless other places where wood must make possible the organized and comparatively stationary warfare which has succeeded the quick movement of mobile troops and supplies. The airplane has become the most spectacular single implement of war and can be built only of wood. No other material gives strength and lightness for frames, or resists the tension upon rapidly-revolving propellers. Finally, to bridge the seas that these things may be accomplished, the wooden ship has come into its own again and is being launched in every port.

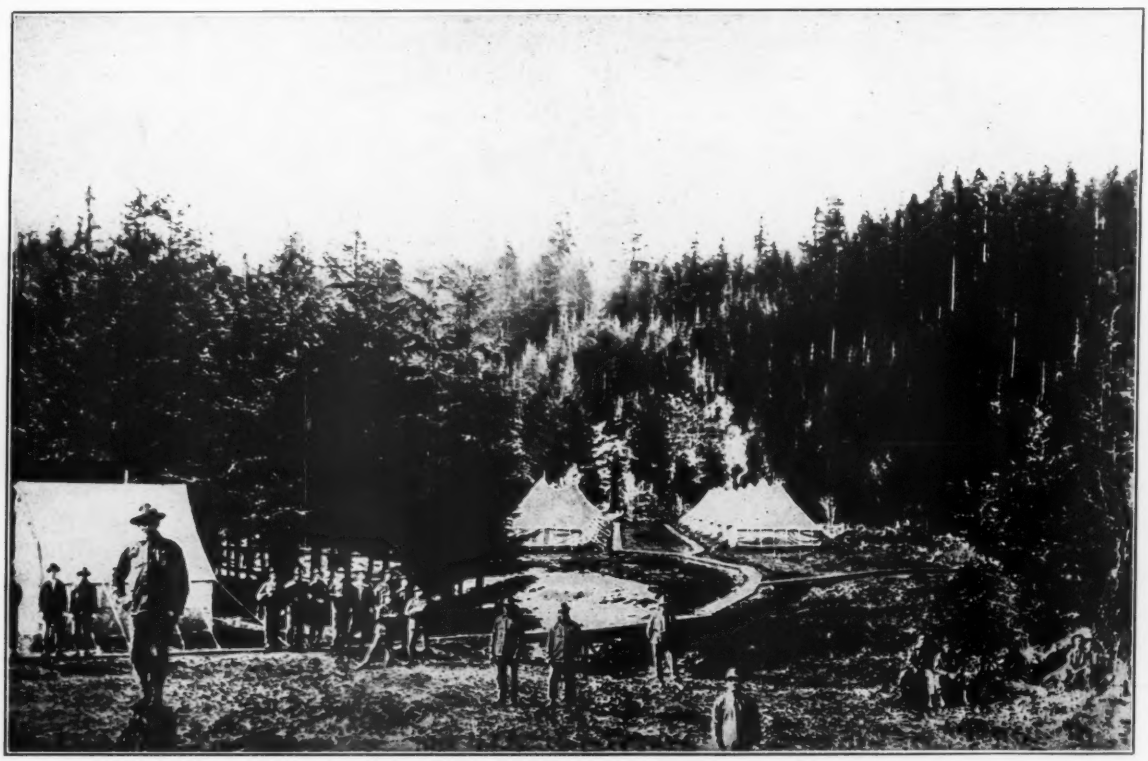


Committee on Public Information

THIS DONKEY ENGINE IS THE LARGEST IN THE WORLD

And it is valiantly doing its bit, operated by lumbermen in khaki—of the "Spruce Regiment"—working day and night to turn out the lumber for our great fleet of fliers.

Out of these necessities has grown a new and unfamiliar arm of military service abroad—the forest troops sent first to Canada to convert the forests



Underwood and Underwood

A CAMP IN THE SPRUCE FORESTS

This is a fine panoramic photograph of a typical logging camp in the forests of the Northwest, where soldier-lumbermen are busily cutting the spruce to be used in airplane construction.

or Great Britain into war lumber, and later extended to France. The work of the Tenth and Twentieth Forest Engineers, composed of American lumbermen and foresters, is familiar to readers of AMERICAN FORESTRY. More unique in many ways, and probably less understood, is the so-called "Spruce Regiment" working here at home in the forests of Oregon and Washington: thousands of uniformed soldiers helping the over-taxed lumber industry get out the indispensable spruce and fir.

Dependence of the Allies upon the magnificent spruce of the Pacific Northwest for airplanes early gave the production of this lumber great military significance. When the American aircraft program was announced last summer the spruce industry was confronted with a staggering task to increase its output sufficiently. Labor, rails, and supplies of all kinds were short. Time, and above all, men, were necessary to open up new tracts. Almost without exception the lumbermen pledged themselves to do their best, realizing as probably no one else could the seriousness of the crisis.

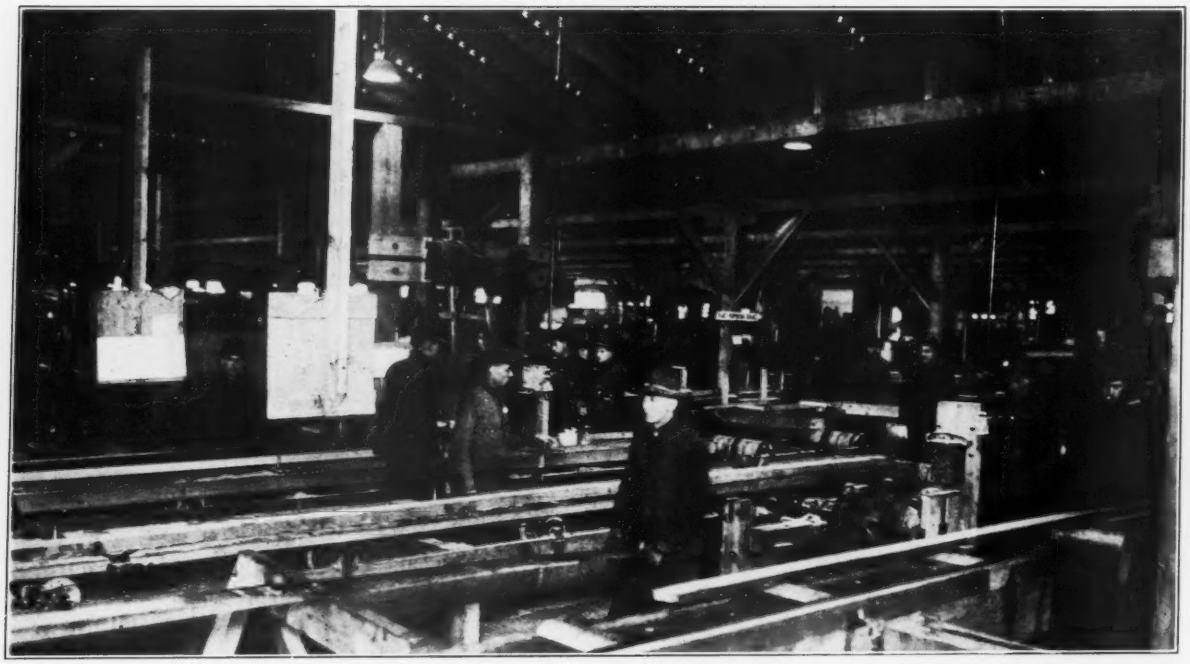
This was the time chosen by the I. W. W. and other agitators to call a strike which almost paralyzed all production for two months. Patriotism prevailed and work was resumed; but not without loss of time, approach of winter, and continual threats of further outbreak. At best, labor was scarce. The outcome of the war was imperiled by this local situation in the Pacific Northwest. Military labor appeared the only solution. It was officially advocated by members of the Lumber Committee of the Council of National Defense, but at first deemed inadvisable, then adopted, by the War Department.

Men of the draft army in the several cantonments who had woods experience were encouraged to apply for this service in the Signal Corps, with the understanding that they would be paid regular woods wages—the excess over army pay being met by the lumbermen to whom they were assigned. In this way a regiment of nearly ten thousand men was devoted to lumber production, but without upsetting labor conditions as would have been likely had they competed on army pay. Although under the Spruce Division of the Signal Corps,

Underwood and Underwood

SOLDIER-LOGGERS CUTTING AIRPLANE SPRUCE

This is the typical spruce which furnishes the perfect lumber required for airplanes, and thousands of men in the "Spruce Regiment" of the Signal Corps are concentrating on its production.



Committee on Public Information

INTERIOR OF CUT-UP PLANT AT VANCOUVER USED BY SPRUCE PRODUCTION DIVISION

they work in the fir camps and mills as well, for fir is needed for ships. Moreover, since the spruce production is not yet adequate for aircraft, fir is being substituted in some phases of this work.

The importance of the service these men are rendering the United States in its preparation for the big task it has undertaken overseas, cannot be overestimated. They are working to supply the material needed for that most vital branch of the army's operations—the scout work of the skies. They are furnishing the eyes of the allied armies. The patriotic labor of the woodsmen in the forests of America is of the highest order and they deserve

Committee on Public Information

INSPECTING SPRUCE LUMBER AT THE SEASONING YARDS, GRAY'S HARBOR

Committee on Public Information

OFFICERS OF THE SPRUCE REGIMENT, AVIATION SECTION OF THE SIGNAL CORPS

the nation's praise—they serve without being able to share in the thrilling and spectacular feats of the aviator.

These men are assigned to camp and sawmills in units, under the charge of army officers. Their food, housing and treatment is supervised. They have all the advantages of soldiers. Their pay runs from $4 to $8 a day, according to the work they are capable of performing. But for this they work hard. The job of a Northwestern lumberjack is no sinecure, nor is it without danger. And it is skilled labor. As an ordinary soldier is trained in the intricacies of modern warfare, the soldier logger must fit with precision his place in the highly specialized system of lumbering in the Pacific Northwest, which has developed to be really an engineering science. The immense size of the trees and the roughness of the country require the use of machinery in almost

Committee on Public Information

ONE OF THE LOGGING CAMPS OF THE SPRUCE DIVISION AT GRAY'S HARBOR, WASHINGTON

every step and failure anywhere means breakdown of the whole operation. For the same reason the capital, skill and inventiveness of the established industry is essential. While the simpler work of the forest troops in Europe can be carried on by the army itself, it is more logical here for the Government to supply the lumberman with the one thing he cannot command — labor —and thus work jointly to keep shipyard and aircraft factory supplied with the lumber without which neither America nor the Allies can make war on land or sea, or in the air.

Committee on Public Information

GASOLINE "BUCKING SAW"

These soldiers are cutting wood for the donkey engine.

Committee on Public Information

A GOVERNMENT SPRUCE MILL AT VANCOUVER, WASHINGTON

Split spruce "cants" going into the army "cutup" plant at Vancouver. To supplement ordinary logging, much spruce was felled and split in the woods into pieces small enough to be taken out without building railroads.

THE STORY OF A THRILLING FIGHT IN THE AIR

STORIES fanciful and actual come through from time to time detailing accounts of air fighting on the Western Front. Authentic letters from the aviators themselves usually make light of the daily exploits, particularly if likely to reach the public, and even in private letters the writers rarely attempt descriptive narrative which pictures their experiences. Of unusual interest therefore is a description of an air battle written by a man who took part in it and brought down the Hun who attacked him.

Such a letter, written by a lieutenant of the Royal Flying Corps to a friend, a timber cruiser of Seattle, has come to us through the New York office of James D. Lacey and Company. As a "newsy" letter from a man in active service to a friend in the States it brings the daily events on the fighting front home with a lesson that makes any sacrifice a very small contribution in support of the men who are over there in the thick of it.

This letter gives a thrill and a word picture which will be appreciated by readers of AMERICAN FORESTRY, and emphasizes the importance of our forest resources in supplying the spruce from which the Allies flying craft are built. America has furnished most of the spruce for the English machines, and it is not to be wondered at that the I. W. W. and other precious agents of the enemy have placed every possible obstruction in the way of spruce production. But they might have saved their effort and their necks, for *the spruce is being produced,* as was told in our March issue. We have the trees and the men to cut them, despite any disloyal sabotage. Any

Underwood and Underwood—British Official Photograph

AN OFFICIAL "WAR PHOTO" MACHINE

This is not a healthy job at best, for it means an extended time spent by a lonely machine over hostile territory, constantly exposed to anti-air craft fire and attack by the enemy in superior numbers. It is daring work, requiring the coolest nerve and utmost skill.

delay in American aircraft production is not from lack of spruce.

Think what would have happened if the lieutenant's machine had not been able to stand up under the punishment it received. At least part of this ability may be traced directly back to our spruce forests and to the men who have fought a small but bitter war in their own mills and camps in order that the spruce needed by our own and the Allied governments might be supplied.

The letter, with a few personal paragraphs eliminated, follows:

"A description of a few hours of the day's work of a pilot and observer in France may interest you. Now that I am away from France, and as long as I am not too detailed, the censor should not object.

"First, let me say, that different squadrons have different types of machines suited to their work. All have their particular duties.

"Corps squadrons control the artillery fire from the sky by wireless, work with the infantry in air attack, photograph the Hun lines, battery positions, etc., and occasionally do day and night bombing as well. I was in such a squadron. Their machines were large two-seaters not very fast and not designed for attack, though adequately equipped for defense in case they are attacked, having a machine gun shooting forward through the propeller synchronized to it. This is worked by the pilot who is in the front. The observer sits in the rear and has a Lewis gun mounted on swivel mounting.

Underwood and Underwood—British Official Photograph

A WRECK OF A GERMAN PLANE

This British Official Photograph might readily picture the Hun machine of this story—so gallantly downed in the air battle here described.

"Then, there are scout squadrons—small, fast machines which can climb like smock. They work in formations of from five to twenty, patrolling behind the Hun lines looking for trouble (and find it).

"There are fighting two-seaters, not quite so fast as 'scouts' but capable of flying and working far higher. They work far out of sight from the ground—18,000 to 25,000 feet up. Then there are night and day bombing squadrons.

"The following incident took place about the end of August, not far from Lens. My pilot and I were detailed to take some two dozen photographs of Hun positions; some of them 15 miles behind their lines and over a front of about 18 miles.

"War 'photo' is not considered a healthy job. It means probably an hour for one lonely machine over hostile territory exposed the whole time to anti-aircraft fire ('Archie' we call it) and the possibility of attack by superior numbers of Huns. One or two won't usually attack us.

"This day we left the ground with a camera fitted into the bottom of the machine, with plenty of ammunition (and be it said a nasty feeling in the pit of the stomach for photos have been taking a heavy toll of late). This feeling, I must tell you, commonly known as 'hund up' is purely anticipatory and disappears when the reality is faced.

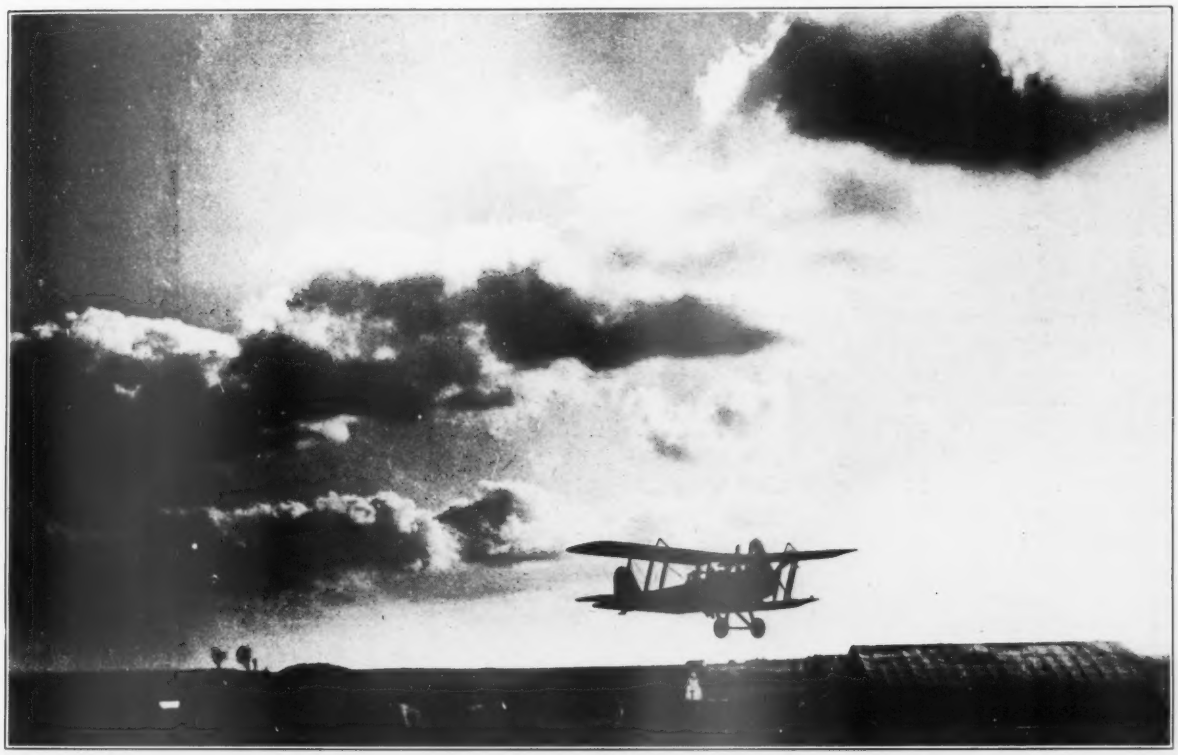
"We climbed to 8,000 feet and then headed East. I took a last good look at the camera, then loaded and cocked my gun and as we approached the lines fired a few rounds to see that it was working well, and then scanned the sky for Hun machines. All was clear, which I indicated to the pilot. Speech is impossible owing to the roar of the engine. The increased vibration told me that the pilot had 'opened out.' I glanced over his shoulder to look at his instruments. They told me that our 180 H. P. (240 American rating) engine was turning over 1,500 revolutions per minute, and that we were cutting the air at 95 miles an hour. We had barely crossed the lines when the 'Archie's' gunners let fly at us. Six ominous black puffs appeared ahead of us, accompanied by that fear inspiring 'Wuff'—'Wuff' as the high explosive shells burst (they use 4 inch and 6 inch shells on us). The pilot swerved sharply and opened the engine out a bit more and 'stuffed' her nose down a bit so that the indicator climbed up to 120 M. P. H.—just in time, too—for a dozen or so shells burst just behind us. Thus we went zig-zagging hither and thither, now opening out and then throttling back. Even at that an occasional shell would burst close to us driving the machine from the shell concussion up or down or sideways according to where it burst, and the hiss of the flying shell fragments making me instinctively dodge.

"Gradually we worked over our objectives and one by one got the 'snapshots.' We had still a half dozen to take when to my annoyance I saw that the camera had jammed. I wrote a note to the pilot telling him and saying that I'd try and fix it up. This was risky as it meant taking my eyes off the sky and getting down into the bottom of the machine, thus courting surprise, for the pilot has only a limited field of view. I got down and had just got the camera fixed when I heard a ta-ta-ta-ta which

meant only one thing—a Hun machine gun. I jumped to my feet and grabbed my gun, and at the same instant saw a Hun Albatross scout only about 80 yards away sitting on my 'tail' and pumping lead at me like a mad man. It was like air to a drowning man to me when I pressed the trigger and saw the flame burst from my machine gun. I was conscious of but three things,—that I was swearing like a trooper; that I had got to kill him or he me, and a sort of wild wonderment that I wasn't being pumped full of lead already. Only one bullet actually hit me. It cut through breeches and tunic but never even scratched me.

"As I had reached for my gun the pilot had made a vertical turn to the right and opened out with our nose finishing in a spinning nose dive which only stopped when he reached the earth, 7,000 feet below,—a mass of tangled wood steel and fabric.

"Evidently I had killed the pilot. Almost at the same instant that he had started on his last dive I became conscious that we were driving at a terriffic rate, and that our forward gun was ripping out its ominous ta-ta-ta. I then, for the first time, realized that there were two more Huns in the front. They had attacked us upwards and under each wing tip. The pilot had suddenly turned and we were rushing straight at each other both spitting bullets at the rate of 600 a minute. We were barely 20 yards apart when he suddenly swerved aside and then dived for home at an incredible speed. He was either



Underwood and Underwood—British Official Photograph

LIMPING THANKFULLY HOME AFTER THE BATTLE

Marvelling that we made it at all—riddled with bullets, with damaged controls, the pilot's instrument board destroyed, flying wires dangling and two struts badly cut, we landed—to find that the radiator had been shot through and two cylinders sized from the heat. But we had accomplished that which we set out to do.

down, so that we were doing about 150 M. P. H. As we turned the Hun flashed across our tail sharply, 50 feet away. I distinctly remember noticing that the pilot wore a black mustache. As he passed I got a short burst of fire into him which made him swerve. I then caught a glimpse of another Hun right under our tail firing up at us and climbing like smock. I gave him a short burst which turned him aside for a moment, and then realized that our first friend had made a complete loop and was again tearing down on us and firing like hell. He was coming straight at me and I got about 50 rounds into him. Suddenly he swerved violently upwards and outwards and went over onto one wing tip and turned over like a falling leaf, over and over and down, wounded or he had 'conked' his engine. The two remaining Huns evidently thought we were tough meat, for they headed east. It was useless to follow as they had too much speed for us. So we watched the other Hun glide down and land in a field, evidently badly lamed. In our drive on him we had reached a speed of 165 miles an hour—a speed beyond the straining point of our machine.

"Let me here pay a tribute to the British design and workmanship, that she did not crumble up under the terrific pressure—especially in her damaged state. It is one of the inexplicable things for which we can only thank God.

"When we came to look at our condition, I marvelled to be alive. We were riddled, our planes were shot to

pieces, and the fabric hanging in streamers—even as I looked the aireron controls gave with a snap as we went to turn. They had just lasted the scrap (they give lateral control). The pilot's instrument board just in front of his face was smashed, several flying wires were cut and dangling and two struts were badly cut. My cockpit looked more like a pepper-shaker than anything else, and one of the Longerons (four) ribs of ash which form the backbone of the machine, as it were, was cut through.

"The pilot throttled back to a safe speed and we took our six remaining photos and then limped thankfully homeward. I was never so glad to be back on *terra firma* before. When we landed we found that our radiator had been shot through and two of our cylinders thus had sized from the heat. Thank God they did not get our engine.

"This, I might say, was the 'closest thing' I had in France, or want to have. Never again did I try to fix a camera over hostile territory. If she jammed—let her.

"I had other fights, of course, but never at quite such close quarters. We were attacked by six once, but got one right at the start and that discouraged the rest. I can tell you the scrap in the air is the most exciting thing imaginable—most too much so."

DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

AMERICAN FORESTRY will publish each month the list of those making donations to this fund. Many of the donations from members of the American Forestry Association so far received were made without solicitation and were inspired by reading in the magazine that a relief and comfort fund for men of the forest regiments was to be started. Many substantial contributions are being received from lumber companies and lumbermen following requests sent to them by the Secretary of the Welfare Fund for Lumbermen and Foresters in War Service, by the lumber organizations of which they are members, and by the committees of lumbermen which had charge in various sections of the United States of securing enlistments for the forest regiments.

In addition to the donations previously acknowledged in AMERICAN FORESTRY, there has been raised in the Forest Service prior to April 1st, for the benefit of the two Forest Regiments, a total of $4,230.68 The inauguration of welfare work for these regiments on the part of the Forest Service antedated the formation of the Lumber and Forest Regiments Relief Committee. By the creation of that committee the Forest Service relief work was co-ordinated with that of the other organizations represented, but the funds raised in the Forest Service have not heretofore been shown in the statements published by AMERICAN FORESTRY. They are, however, truly a part of the Welfare Fund though directly collected and disbursed by the Service and members of the Forest Service are steadily adding to their gifts. The two funds are and have long been virtually consolidated and handled under a single management. It is, therefore, considered appropriate at the present time to include in the published statement, as a lump sum "from the Forest Service" the total contributed up to April 1st. Contributions made since that date are acknowledged with credit also to the Office or Forest from which the several amounts are received.

Contributions to the Welfare Fund to June 1, 1918, are as follows:

Previously acknowledged	$14,748.68
From the Forest Service to April 1st	4,230.68
Arkansas Short Leaf Company, Pine Bluff, Arkansas	10.00
Coles, John W., Philadelphia, Pennsylvania	10.00
Forest Service, District No. 2, Denver, Colorado	350.00
Forest Service, Washington Office	2.00
Gunnison National Forest, Colorado	27.50
The John D. Mershon Lumber Company, Saginaw, Michigan	25.00
Nelson, John M., Jr., Pottsville, Pennsylvania	5.00
Noah Adams Lumber Company, Oakland, California	10.00
Prince Lauten Company, New York City	20.00
J. S. & R. M. Rice Lumber Company, Houston, Texas	10.00
Roper Lumber Company, Employees of New Bern Plant, North Carolina	20.50
Sabine River Lumber and Logging Company, Oakdale, La.	22.70
Sterling Lumber Company, Bastrop, Louisiana	5.00
Total	$19,497.06

WRITE TO THE SOLDIERS AND SAILORS

THE following extract is from a letter written by Lieut. W. H. Gibbons from France:

"If it is not in poor taste, I would like to suggest at this time that all of you write all these men often, and that you pass the word along to all your friends that they should write all their soldier friends often. I don't know just why it is, but I do know it is a fact that the American out here is a big baby when he is not receiving what he considers his proper ration of mail, and he is a mighty hungry fellow when it comes to mail.

"I can suggest no better way for you to help win the fight. I am not thinking particularly of myself and those who are serving in a similar capacity—and we find letters from friends ever so much better than heat, meat and drink—but of those who will face the Hun at short quarters.

"Organize as you will, we are going to fight as individuals, and no American boy will put up his best fight if he feels that the folks back home have forgotten him, and he is too prone to imagine such things.

"If it were within my power, every paper in the U. S. A. would feature every day, 'WRITE.'

"These letters will not only help them to fight, but they will help keep them straight and ready. I feel truly sorry for the poor devils that receive no mail. I hope there are none such."

THE USES OF WOOD

THE SAWING AND TRANSPORTATION OF LUMBER

BY HU MAXWELL

Editor's Note:—This is the second story in a series of important and very valuable articles, by Mr. Maxwell, on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THE cutting and hauling of sawlogs is only the first step in converting the raw material of the forest into finished products ready for use. The next step is the conversion of the logs into lumber and the transportation of the lumber to the places where it is to be still further manufactured or employed without further manufacture. The sawmill is the largest wood-using machine that man has yet used, and there are innumerable other and smaller machines employed in working the wood after it has been reduced to the form of lumber. The great sawmills of America have come up from very small and insignificant beginnings. They are the product of evolution in plan and of development in method.

THE SAWLOG'S LAST JOURNEY

The logs are going up the logway into the mill. They have reached the end of their journey as logs, and will soon be lumber, ready to enter upon a career of usefulness. The water in the log pond washes them clean of gravel and floats them to the carrier which delivers them to the saw.

The cutting of logs in the forest and their transportation to mills at central points for sawing are the two major operations in logging. The two major propositions in lumbering are the sawing and the distribution. After logs are cut in the woods they are brought together and after lumber is sawed at the mill it is distributed. Where the log's career ends, lumber's commences, and the first step is the sawing. This history of the development of the sawmill is interesting and instructive, but it must here be passed over with the merest mention.

The pitsawyer, a hand workman, was the forerunner of the sawmill, but even the pitsawyer was not the most ancient lumber maker, if we can credit old Egyptian pictures. The man who hewed out boards with an adz that had a blade only an inch wide, was earlier than the earliest manipulator of the pitsaw, but primitive lumbering was a very small business, and, though interesting as a step in the growth of human ingenuity, it contains little of practical importance for us.

The immense timber wealth of America tempted the first settlers to make lumber. The reports written by early explorers, and by the governors of colonies, are filled with references to the fine timber, the numerous water power sites, and the prospects of trade in lumber both at home and for export. They were thinking as much of export as of home needs at the time of the earliest mention of sawmills and lumber

making in America. The eye of the colonial governor was on trade opportunities, and he saw them in the wealth of trees in every valley and on every mountain. They went to work as soon as possible to build mills. The dates and the locations of the very earliest sawmills in the present territory of the United States are doubtful; but there

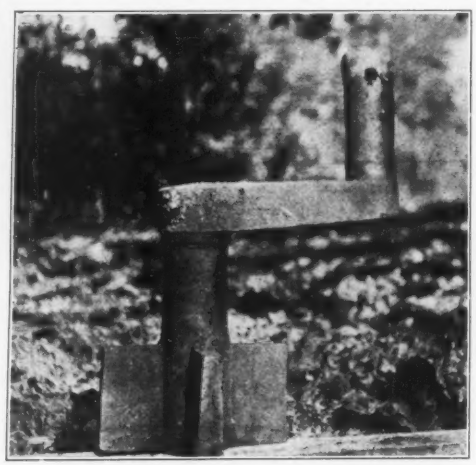
STACKING LUMBER BY MACHINERY

This reaches the high point of efficiency in the handling of lumber, accomplishing a maximum of labor with a minimum expenditure of time and effort.

seems to be no question that there were water power sawmills in New England within ten years after the first settlement at Plymouth. That was speedy work when the fewness of the colonists, the difficulties of procuring machinery, and the limited market for lumber are considered. The Virginians were not much behind the New Englanders in mill building. It is believed that New York's earliest sawmills, or some of them, were driven by wind power. The knowledge of windmills was brought over by Dutch settlers.

Sawing by man power continued side by side with water power, not only during very early American history, but down almost to the present. It was called pitsawing, and two men manipulated the saw, one on top of the log and the other in a pit under the log. However, it was more usual to raise the log on a scaffold, so that the man beneath could stand erect. The log was first hewed square, and with paint, chalk, charcoal, or keel, the lines to be followed by the saw were marked on the flat upper side of the log. Two men could saw about 100 feet of lumber a day. The saw was given a stroke of three or four feet, and the operation was slow, crude work. Yet it held its place a remarkably long time, if it has even yet gone wholly out of use. The West Virginia Geological Survey Report of 1910 stated that pitsawing was in use in sparsely settled districts of that state "within the past five years." A house was standing a few years ago, and may still be standing, in Tucker county, West Virginia, that was built after the Civil War of cherry lumber that was made by pitsawing. In Bodega county, California, the pits are still pointed out where the Russians sawed redwood with pitsaws; while, to go a little farther from home, but nearer in time, American army officers, during Aguinaldo's insurrection in the Philippines, pitsawed Philippine mahogany for bridge planks and other military works in the islands, and miners along Alaska's rivers still saw boat planks by that process, if beyond reach of sawmills.

During the height of the salt industry in the Kanawha valley, nearly a century ago, builders of barges for carrying the salt down the Ohio river, cut enormous yellow poplar barge sides by pitsawing, though sawmills were then in reach. No sawmill then could saw planks so large as those demanded by the boat builders. Some of the planks were reported to be 80 feet long, three feet wide, and four inches thick cut by hand from the gigantic poles of the poplars that grew on the banks of the Kanawha, the Coal, and the Ohio rivers. The earliest water mills in use were driven by wheels known as overshot, undershot, pitchback, breast, flutter, or some other descriptive name, and mills so driven are still found in some rural districts. The turbine came later, after men had learned how to use water economically by obtaining high pressure. Then came the steam mill, which is with us yet.



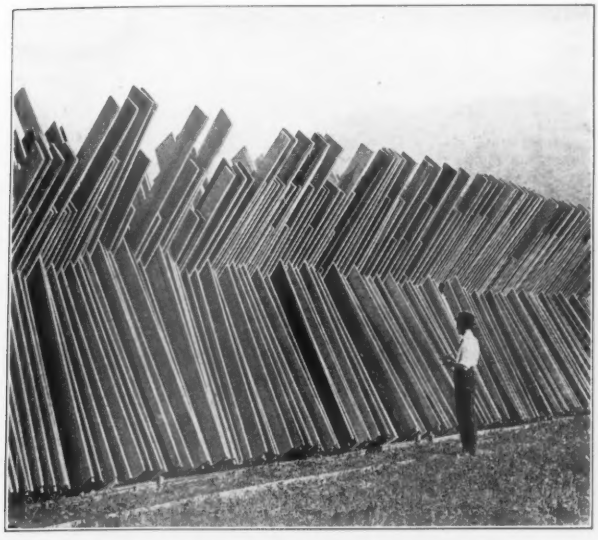
ONE HUNDRED AND FORTY YEARS OF SERVICE

This old crank began driving an up-and-down saw 140 years ago, and has been at it much of the time since, though it now lies abandoned in a trash pile where its last work was done. In 1776 a pack horse carried it across the Allegheny Mountain from Winchester, Virginia, to Cheat river. The photograph for the cut was taken in 1916.

The principal types of mill saws have been in use a long time. The sash or gate saw was held rigidly in a frame and had an up-and-down motion, the frame moving with the saw. The gang that came about 1650 had several saws instead of one, all in the same sash and of course, all striking simultaneously. The muley differed from the sash saw in that the saw moved between guides and the frame was stationary. The circular saw made its appearance about 1790, and the bandsaw in 1808; but the bandsaw, because of difficulties in manufacture, was a long time in attaining success. The early attempts failed because the saws were liable to pull apart at the point of brazing.

The saw of today is a marked improvement over those used in sawmills one and two centuries ago. The modern tool is made of

better steel and its temper is more even and better adapted to the work it is expected to do. But the greatest improvement is in the teeth, the set, and the gage. The old mill saws were thick and they wasted in the form of sawdust with no pretense of economy, and while doing it, they wasted power, for the thicker the blade, the greater the force required to drive it through the



AIR DRYING YELLOW POPLAR LUMBER

The purpose of stacking lumber on end, in the manner shown in the cut, is to give it good circulation of air to hasten the drying process. Water does not flow out of the boards at the lower end by gravity, as was formerly supposed. It evaporates from all parts of the surface.

log. The modern saw is as thin as it can be made without sacrificing its necessary strength. The bandsaw cuts out hardly half as much dust as the thick circular. The pioneer lumberman did not care for waste, but the modern mill man cares, and he selects his saws with an eye single to economy in wood and power. Spring-set teeth always did smooth work, and the swaged tooth was a long time gaining recognition; but when it came it proved to be a power saver as well as a saver of the filer's time, and it was inevitable that such a tooth should win the day for general use.

An extra smooth surface on lumber, free from tooth scratches, is not considered so important now as formerly; for at the present time nearly all lumber is surfaced by machinery before it is used, and saw marks are easily planed off; but formerly the planing was done by hand and a rough surface involved extra work. Attempts have been made to devise saws which will smooth the surface of the lumber as it is sawed, all in one operation; but users have not generally looked on that as an economy, since such lumber must still be passed through planers if a true, smooth surface is wanted.

The problem of getting lumber to consumers after it has been sawed, is enormous and complicated. The manufacture is simpler than the distribution and sometimes cheaper. The transportation of lumber differs somewhat from the transportation of logs, though both use the same means of conveyance, such as horse vehicles, boats, rafts and steam trains.

The problem was not always so complicated. When mills were all small, and the customers lived within a few miles, the same team that brought logs in might haul lumber out. That method still holds with a few small mills, but not with many. The lumber generally goes farther than the logs come. The average length of the log haul in the United States is considerably less than 100 miles, perhaps less than half of it though there appear to be no figures showing exactly what the average is. But the average length of the lumber haul by steam roads is about three hundred miles. To be exact, it is 299 miles, according to figures published by the Bureau of Foreign and Domestic Commerce. This does not include water carriage or hauling by wagons. Were these included, the average length of the lumber haul would be shorter, but it would still be three or four times, at least, as much as the average length of the log haul.

Had railroads not been invented, the lumber business could not have attained its present dimensions. The industry's growth has been due more to steam transportation that to the invention of wood-working machinery. Large sawmills would never have been built if railroads had remained unknown. Distribution is often more important than production.

There appears to be a tendency of trade, or a rule amounting almost to the force of a natural law, that the

SAWMILL DRIVEN BY AN OVERSHOT WATER WHEEL

Small mills like the one shown in the picture were the earliest in America and they supplied the first settlers with lumber. The mill's capacity was 1,000 feet or so a day. A few such are still at work. This one is operating among the mountains of eastern Tennessee.

further wood is manufactured into products, the more widely it is distributed. Apparently that tendency holds true through all steps of manufacture until the final users of the wood are reached. For example, a door, a handle, a wagon felloe, a strip of flooring, or a piece of furniture, may go 2000 miles to find a buyer, but a log, unless of extraordinary value, would never go that far. It cannot stand the freight charges, and only certain kinds of lumber can stand the cost of a carriage so long.

Vehicles drawn by horses or oxen have always been employed in hauling lumber, generally for short dis-

tances and on a small scale, and they do so still; but when circumstances have been favorable or necessity urgent, lumber has been hauled in large amounts and for long distances by teams. Some of the California sugar pine mills formerly sent their lumber by wagons as much as fifty miles; and a single team of twelve horses sometimes drew from 10,000 to 15,000 feet at a load. In the northern snowy regions, such as New England and the Lake States, hauling lumber on sleds may be done on a large scale.

Rivers have carried a great deal of lumber in rafts, but not much in loose form by floating. If left free to drift down stream, boards are liable to be damaged by breaking or by the deposit of mud upon them. During generations, the rafting of lumber was an important business on many of the rivers of New England, New York, Pennsylvania, West Virginia, and westward through the Lake States; and there was some movement of lumber by boats on those streams. But the principal carriage of lumber by water in the United States has been on the Great Lakes. There are more figures to show lake traffic than are available for the rivers, at least, during early years. In 1889 the lake ports, on the American side, shipped 3,428,628,500 feet of lumber, but seventeen years later the total had fallen to nearly one half of that, and it continues still to fall. The decline in lake carriage of lumber has been due to two causes, first, the exhaustion of some of the former producing districts; and, second, the extension of railroads and the capture by them of the business formerly going to the boats. In 1906 the whole inland water traffic in lumber in the United States was less than two-thirds that of the Great Lakes alone in 1889. This indicates a tendency to transfer the carriage of lumber from boats to railroads. The decline in water transportation of lumber is still going on, and manufacturing districts depend for supplies more and more upon railroads. About fourteen per cent of all the revenue of the railroads of the United States comes in normal times from hauling lumber. The revenue of the railroads from carrying forest products in 1910 was $269,577,425.

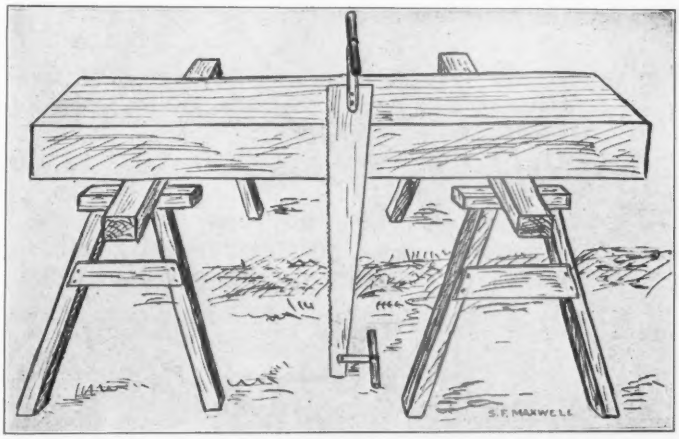
The country's railroads have generally proved equal to the task of distributing lumber when and where needed. Temporary and local difficulties, including floods, snow, embargoes, and the fortunes and misfortunes of war, have sometimes delayed arrivals, but as a rule the railroads have done their part in carrying lumber from the mills that make it to the men who use it. During the year 1910 the railroads of this country carried 62,000,000,000 feet of forest products, principally lumber; and that, too, in spite of the fact that the total lumber production that year for the whole country was only 40,000,000,000 feet. On their face, the figures seem contradictory in that they show twenty-odd billion feet more hauled than the total output. The expla-

LINES OF BEAUTY IN A LUMBER YARD

A clean, well kept, well planned, well ordered lumber yard tells a story of good management. Decay has no chance to get a foothold there. There is nothing slipshod about the one shown in the cut, and the bookkeeper can ignore the item of waste in balancing profit and loss.

nation is that much of the lumber was shipped twice and was counted both times—once, probably, when it was carried from the sawmill to the wholesaler, and again when reshipped to the retailer or user.

Many regions which once produced lumber and shipped it, have been cut out, and they are now buyers. As an illustration, Michigan now purchases outside of its borders one-fourth of all the lumber used by its factories. Other regions have had similar history. A century ago New York shipped pine to Louisiana; now Louisiana ships pine to New York. The laws of supply and demand are beautifully balanced in the lumber business. California receives oak from Indiana: Indiana uses California redwood. Lumber centers have been changing during two hundred years, old going out, new coming in; and further changes in source of supply, and likewise in demand, will come.

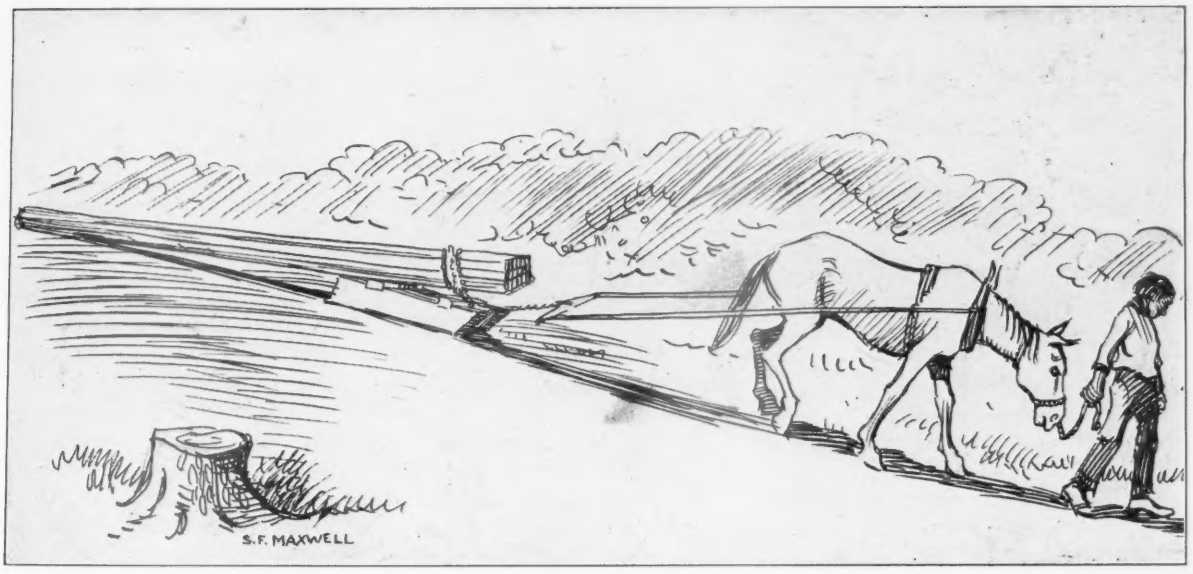


A PRIMITIVE PITSAWING OUTFIT

The illustration shows the tools and method formerly used in sawing lumber by man power. One sawyer stood on the log, one below, and the cutting was done by the downward stroke of the saw. About 100 feet of boards constituted a day's work. The process was sometimes known as whipsawing.

Thirty-five years ago a carload of lumber was from 10,000 to 25,000 feet. It is twice that now, and single cars have been loaded with more than 50,000 feet. California lumbermen used to boast that their teams could take more than a carload at a trip, meaning, perhaps, 15,000 feet for ten horses; but no team of horses now takes a modern carload of lumber at a trip.

The man whose factory turns out commodities made of wood, wants his lumber in dimensions which will work into his products with the minimum of waste, and the sawmill undertakes to give him what he wants. The tendency in sawing lumber has been toward an increase in the number of sizes to meet the requirements of different users. When most lumber was employed in making fences or in the construction of rough buildings, as once was the case, a few sizes sufficed and there was little call for anything outside of those sizes, in length, breadth, or thickness; or, if there was a call for something out of the usual, the mill cut what the customer wanted and considered it a special job. The number of sizes has increased to such an extent that it is no exaggeration to say that they are numbered by hundreds, if each length, thickness, and width be understood as a separate size. It depends, too, upon the kind of wood, for dimensions are not the same for all kinds. The user's needs are studied. It was once the general custom of the mills to ship similar dimensions to various



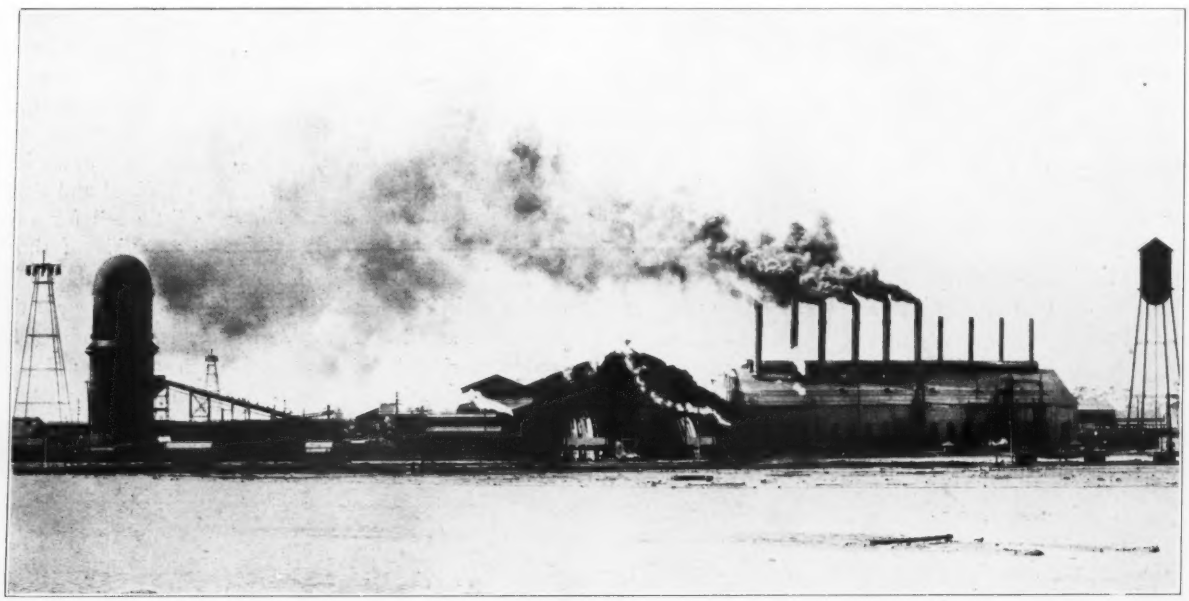
HAULING LUMBER IN CALIFORNIA IN 1914

The above drawing was made from life and represents a "Big Sandy" Indian pursuing the path of civilization. He is hauling lumber down the Sierra Nevada Mountains with his own horse and sled to build a barn for his own use on his own ranch in the canyon three miles below.

users, leaving them to rip and cut in order to work out what they needed. It is apparent that such an arrangement would not be satisfactory to the diversified wood-using industries of the present time. Each insists upon receiving certain sizes which can be converted into finished products without unnecessary work or excessive waste.

Lumber grades are based partly on sizes and partly on defects. The grading of this commodity has been worked out almost to the last analysis, but the practice is rather recent and was brought about by necessity. While grades were not designed primarily to meet the requirements of particular industries, that result has been nearly attained; for, with the various grades now in use, any wood-using industry can order the stock which it can use to the best advantage. Grades satisfactory to a furniture manufacturer would not be satisfactory to a maker of flooring; and grades which conform to the needs of vehicle manufacturers would fall short of satisfying a box maker. It has thus come to pass in the development and extension of the uses of wood that numerous sizes, in length, thickness, and width, have been provided to meet the demands of different industries. These sizes have not been planned by the sawmill for its own convenience alone, but the demand for them originated with the users, and the sawmills have conformed to the demand, being in that particular the servants rather than the masters of factories and shops which use lumber as raw material.

The determination of what shall constitute certain grades is not an easy matter, and in the past the discussions growing out of it have not always been wholly friendly when the matter has come up between seller and buyer. The man who makes the lumber, grades it; and he sells it to the user at prices based on grades. The largest users are factory owners who make furniture, interior house finish, boxes, and numerous other commodities; and there have been many controversies over the question whether the buyer should not have something to say about the classes of material to be included in the different grades. A conflict of interests exists, but the advantages are about evenly divided between the parties. For, though the maker of the lumber may have the last word as to how he will grade his product, the purchaser has the last word as to what he will pay for it. That situation provides ground for compromise, and the compromise is attained when the sawmill fixes and names the grades, and the factory offers the price it is willing to pay for each grade and then insists on getting the quality of lumber which the grade calls for. At the present time most grades are so well established that they are no longer called into question, and if disputes arise as to the correctness and efficiency of the grading, the associations which buy and those which sell the lumber have provisions for settling disputes by arbitration.



THE LARGEST SAWMILL IN THE WORLD

The plant of the Great Southern Lumber Company, Bogalusa, Louisiana, is the largest sawmill under a single roof in the world. Its record is 1,018,000 feet of lumber in a day. This plant has been cited as one of the finest examples in America of scientific conversion of timber on a large scale. Its output is principally yellow pine.

A large part of the lumber that is to be shipped by rail is first made smooth by being passed through planing machines, without much regard to what is to be the final use of the stock. The chief purpose in this operation is to reduce weight and thereby save freight charges. From 400 to 600 pounds of wood may be removed in the form of shavings when a thousand feet of lumber pass through the surfaces. The planed material is lighter by that amount, of course, and the freight charge is correspondingly less. The average freight paid on all lumber carried by railroads in this country is about fifteen cents for each hundred pounds. The removal of 500 pounds of shavings from a thousand feet, reduces

the freight charge by approximately seventy-five cents—calculated on the average shipment. The owner of the lumber usually planes it at his own expense and saves in freight more than the cost of planing.

It is poor economy to ship lumber that is not fairly dry. Some is piled to season in the open air, other for quicker results is placed in kilns. The weight of a thousand feet of lumber is reduced through drying by at least 1,000 pounds, and the weight of some kinds is reduced more than 2,000 pounds, and the freight cost is lessened accordingly. The saving amounts to $1.50 a thousand feet, on an average, if the weight is reduced only 1,000 pounds. "Shipping weight" is a term in use for lumber that has had its weight considerably lessened by seasoning but which has not yet reached that state of dryness fitting it for factory use. Before "shipping dry" lumber is ready to be worked into finished commodities, like furniture or vehicles, it must be sent through the kiln or must spend a considerable time in the open air.

A LUMBER YARD AERIAL RAILWAY

The highest development of lumber movement in the yard is by the overhead railway. The lumber car is swung beneath the rail and moves rapidly, clear of all obstructions, to the precise point desired, and the load is there released. Only the largest yards have this system of railways. They are not profitable on a small scale.

About forty-five per cent of the total quantity of lumber turned out by the sawmills of this country, is used in its rough form, without further manufacture, for such purposes as railroad cross ties, trestles, bridges, house frames, scaffolds and fences. The remaining fifty-five per cent of the lumber production is further manufactured before it reaches its final use. Most of it passes through shops and factories, though some of it may be merely surfaced or planed and in that form go to its ultimate use. Other lumber passes through several processes before it is converted into finished products. The amount of detail in such manufacture depends upon the industry to which the lumber is sent. A number of industries, in fact, most of them, employ special machines and pass the wood through complicated processes to convert it into commodities.

In the United States Forest Service's investigations of wood utilization, fifty-six industries were recognized in which wood is employed as raw material for further manufacture. The country's lumber output may be divided into two general classes: first, that which is to be used without further manufacture; second, that which is sent to shops and factories where it undergoes additional processes. The second class includes a little more than half of all the lumber produced by sawmills in this country. The fifty-six industries to which it goes do not receive equal amounts. One may demand a hundred times as much as another. The largest call comes from planing mills that make flooring, ceiling, cornice, siding and similar stock which is used chiefly by builders. More than half of all lumber going to factories for further working is taken by the planing mill industry. So numerous are the articles turned out by such mills that it is not practicable to compile a list of them.

Though the planing mill industry exceeds in importance all the rest of the fifty-six, some of the others are

of large dimensions. The box business is second in size and calls for more than 4,500,000,000 feet of lumber a year. The making of boxes is one of the most widely distributed of the wood-using industries, and the business is growing rapidly to meet the demand for shipping containers for food products and other commodities. There are in this country fifteen industries which demand more than 100,000,000 feet of wood a year in their manufacture. The fifteen are:

	Feet.
Planing mill products	13,428,000,000
Boxes	4,547,000,000
Railroad cars	1,262,000,000
Furniture	1,233,000,000
Horse and Motor vehicles	739,000,000
Woodenware	405,000,000
Agricultural implements	321,000,000
Handles	290,000,000
Musical instruments	260,000,000
Tanks and silos	225,000,000
Boats	199,000,000
Office and store fixtures	187,000,000
Coffins	153,000,000
Refrigerators	137,000,000
Excelsior	100,000,000

Among the wood-using industries with annual demands below 100,000,000 feet, are the following, listed in the order of quantity of wood consumed in making their products: Matches and toothpicks, map rollers, paving material, trunks and valises, machine construction, shoe findings, pumps and pipes, pulleys, scientific instruments, toys, gates and fencing, sporting goods, bungs and faucets, brushes, dowels, saddles and harness, butcher's blocks, whips and canes, firearms and airplanes.

The statistics showing the relative quantities of wood going to these industries are over four years old, antedating the war, and there is no doubt that figures dealing with more recent production would change the relative importance of some of the items. That would certainly hold true of firearms and airplanes which now require large quantities of wood selected with special care.

ORIGINAL SOURCE OF STRONG TIMBERS

The forest here shown is near Kirk, Missouri, and from such places come fine logs and lumber suitable for construction where strength is one of the chief considerations. It is hardwood chiefly. The power skidder is at work in water where oxen and horses could find no bottom to stand on.

It would be misleading to assume that all wood that reaches factories is first converted into lumber at sawmills. That holds as a general rule, but there are many exceptions. The logs from which excelsior is cut are not first made into lumber. Much of the handle wood does not pass through sawmills, and part of the toothpick, match, shuttle, and shoe last wood does not. The material for some of these goes directly to the factories in the form of logs or bolts; and statistics of lumber production do not include this material.

The wood-using factories of the United States employ a little more than two feet of softwood to one of hardwood, or 17,175,000,000 feet of the former yearly to 7,500,000,000 feet of the latter. The lumber output of softwood is approximately three feet to one of hardwood. It is thus apparent that in proportion to the supply of the two classes of lumber, the choice is in

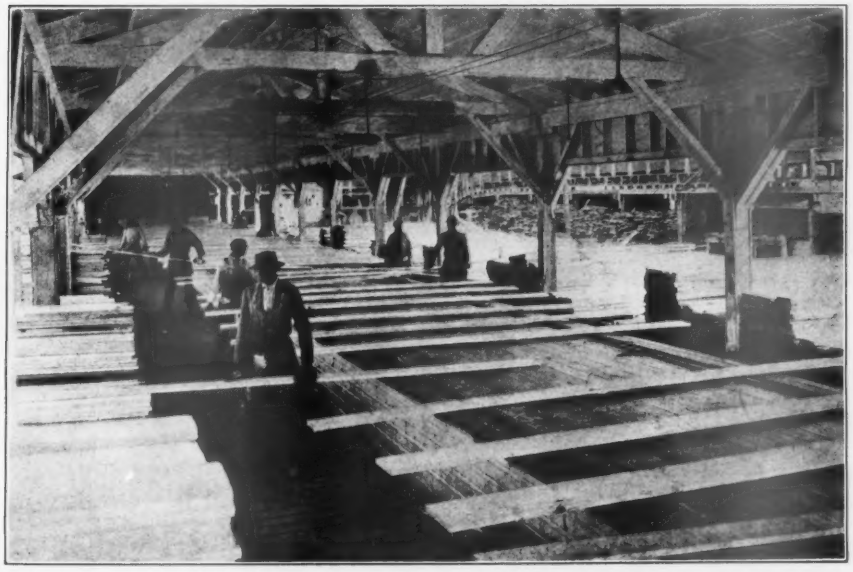
favor of the hardwoods in those factories where wood is reworked.

The softwoods are far more abundant than the hardwoods in the forests, taking the whole country over, but in the variety of uses the hardwoods are in the lead. The country's forests contain at least six feet of softwoods to one foot of hardwoods; but in number of species, the hardwoods are four times as numerous as the others. The softwoods are usually defined as the needleleaf trees, the hardwoods as the broadleaf. That is the only line of division on which there is general agreement, and the division is based on botanical characters rather than on the actual hardness or softness of the wood. The genera of trees belonging in the softwood class in this country are not so numerous but that they may be listed in a dozen words. They are: Pine, larch, spruce, hemlock, fir, cypress, redwood, cedar and yew. All others are hardwoods, though some persons would place the palms and yuccas in a third class, but they are of relatively little importance as wood.

A MINNESOTA LUMBER FLUME IN WINTER

In the North's cold winter climate water will freeze solid in one day in a flume like this, and of course it would then be useless as a lumber carrier. Flumes may transport logs as well as lumber down hill and over rough country. The method is successful in well-built flumes.

Pine constitutes a little more than half of all the wood going to shops and factories in this country, and fir furnishes the second largest quantity, the principal species being Douglas fir of the Pacific Coast. The hardwood which furnishes most is oak, with maple second, red gum third, and yellow poplar fourth. Every species, whether hardwood or softwood, that attains suitable size and exists in commercial quantities, goes to shops and factories somewhere in the United States, though some species supply only small amounts. Among those making the most insignificant showing are: California laurel with 68,000 feet a year; holly with 72,000 feet; yucca 86,000, and applewood 321,000.



GRADING AT THE SORTING CHAINS

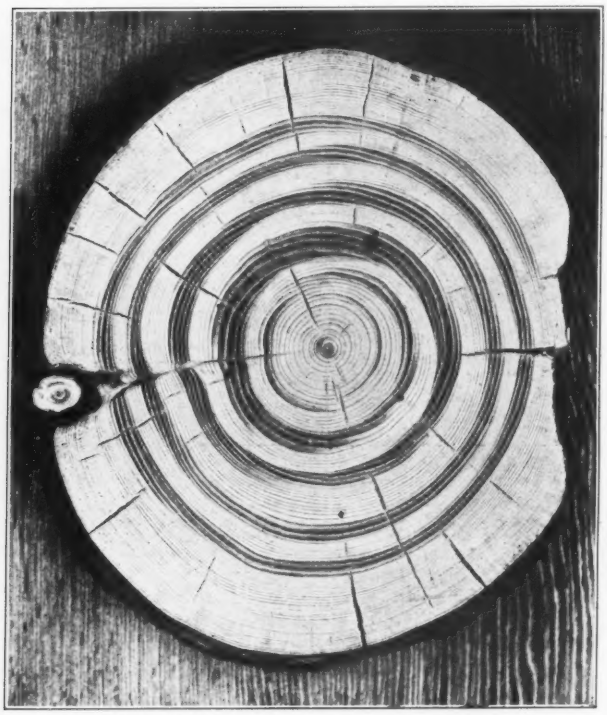
As the freshly-cut boards ride down the moving chains from the saw toward the lumber yard, experts who have been trained by long experience grade the stuff, placing the various grades in their proper piles. These men hold responsible places, because profit and loss depend on the accuracy of their work.

It would be a mistake to assume that the woods used in smallest amounts by manufacturers are the least desirable. California laurel is proof that such is not the case; for excellent judges of fine woods have pronounced it the most beautiful wood of our forests. It is the "black myrtle" that has sometimes puzzled connoisseurs. Considerably more of it might find its way to factories which make furniture, interior house finish, and musical instruments, if the Californians were less willing to sacrifice beauty to utility. They use it for bridge floors and the walking beams for pumping oil wells.

THE SPIRAL SPRUCE

BY ALICE SPENCER

A CROSS section of a spruce tree, recently received from Alaska, shows a most peculiar spiral structure which has caused a great deal of speculation among the various foresters throughout the country. Although no definite explanation has been offered, a theory has been advanced in regard to its history which is extremely interesting.



NO, IT IS NOT A BULL'S-EYE—FAR MORE INTERESTING

Can you imagine a tree making almost five complete revolutions without getting dizzy and falling over? That is what this spruce tree did, and in the middle of the fifth revolution it resumed an upright position and was still growing when cut, at the age of 83 years. It will be noticed that the darker band is a continuous formation, winding from the center to within half an inch from the circumference, crossing the annual rings.

It is known that a coniferous tree, growing at a slant, forms, on the lower side of the trunk, a dense reddish wood known as "rothholz." As the "rothholz" in this particular specimen is a continuous formation, winding from the center to within half an inch from the circumference, it is surmised that it was growing in an inclined position on the edge of a glacier where it was caused to rotate so that different radii of the stem were successively on the downward side, thus causing the "rothholz" to intersect the annual rings and, as the tree grew older, forming a spiral.

The formation of the "rothholz" apparently began when the tree was six years old, the "rothholz" as well as the tree itself making almost five complete revolutions, requiring from eight to nineteen years for each revolution. The tree was 83 years old, as determined by counting the annual rings, and the formation of the "rothholz" ceased about 21 years before the tree was cut, which means that the tree must then have assumed a vertical position.

It is reported that where this specimen was collected, a number of other spruce trees showed the same phenomenon.

We like to believe that this tree foresaw the great world war that was to take place some eighty odd years after it began its existence and knew that it would be called upon to aid in the struggle for democracy. Therefore, with the aid of a glacier, it began the peculiar gyrations which proved its fitness for airplane stock.

Ten revolutions in ten seconds, with head bent to the knees, at the end of which time he must resume an upright position, is one of the tests given an aviator, but even he will admit that five revolutions in a lifetime is doing well for a tree.

A LETTER FROM ONE OF OUR READERS

To the Editor, American Forestry,
Washington, D. C.:

IN THE AMERICAN FORESTRY for November, 1917, on page 669 are these words: "One of the most curious things about this sassafras tree is the form of its leaves; they are dimorphous . . . that is, the earlier ones are oval in outline and entire, while those coming out later are irregular in outline and three-lobed." As I have had abundant opportunity for many years of examining and studying the leaves of *Sassafras officinale* I am much surprised that the author of the article in FORESTRY did not state that this little tree bears leaves of three distinct shapes, namely, simple ovate and entire leaves, three-lobed leaves, and leaves having each the shape of a man's mitten with a thumb lobe on one side only. There are, therefore, the simple ovate leaves, the mitten-shaped leaves, and the three-lobed leaves upon the sassafras. Many and many a day and month I have watched these growing on the sandy hills east of the city of Toronto. The article in question is certainly very interesting and instructive; but, I think it well to have this correction made.

Respectfully,

HENRY MONTGOMERY.

Cleveland, January, 1918.

WIN THE NEXT WAR NOW

BY CHARLES LATHROP PACK

PRESIDENT, NATIONAL WAR GARDEN COMMISSION

IN THE hearts of more than one million of the best and bravest men of the United States, now serving in the American army and navy, there is this great thought:

"We are fighting now so that there may be no more world wars. We are going to see this through to the finish, if it takes every last one of us to do it. The world must be rid forever of military autocracy."

Like a night chorus back of them the American people from coast to coast respond:

"We too are going to fight until victory is complete. There will be no compromise which might mean another war. We'll win the next war now."

This means that there must be no limit to the efforts put forth. There must be constant work and unstinted giving. Every one must exert himself to the utmost. There must be vast production. There must be conservation in all directions so that plenteous supplies may be on hand and that the army and the navy, and the workers who are turning out material for them, may be properly fed and clothed and housed. Nothing must be wasted,—nothing must be squandered. There must be generous and open-handed giving to the Liberty Loans, War Savings fund, Red Cross and all the activities that are helping to win the war.

Photograph by La Tour

BIGGEST CAMP GARDEN STARTED AT CAMP DIX

Col. Edmond Tompkins, Camp Quartermaster at Camp Dix, New Jersey, greets the first truck load of the "Seeds of Victory" given the 48,000 soldier boys by the National War Garden Commission. Following this the Reclamation Division of the United States Army, at the direction of Col. J. S. Fair, will spend $60,000 for war gardening at other camps.

The soldiers themselves, in addition to fighting the battles of Democracy are showing their deep patriotism their whole-hearted love of country by other sacrifices. They are not only giving themselves. They are giving their money. They are buying liberally from their small salaries of Liberty Bonds. They are purchasing thrift and war saving stamps. And now they are going to help feed themselves. They are willing, yes, eager, to do anything for the cause they represent—the firm establishment of freedom and peace throughout the world. The men of the American army realize the importance of food in this war. They recognize the value of military training, the necessity of guns and ammunition and ships and airplanes; but they know that back of all these is food. No army could last a week without it, whereas it might hold out for some time without certain other supplies. The American army, therefore, is starting to raise part of the rations needed for its own support. The French army has been doing this for several years, and this year expects to produce in war gardens back of the line enough vegetables and greens to supply the entire army with that part of its food. Last year it fed a considerable portion of its troops in that way. The English army took up the plan and this year has the work well under way—soldiers who are physically incapacitated for service at the front and those who are back of the lines, waiting to be called into active service, take care of the war gardens.

Camp Dix at Wrightstown, New Jersey, witnessed the inauguration of war gardening in the army camps of the United States. There arrived at the "city of 48,000 soldiers" recently nine big motor truck loads of seed, fertilizer, plows and cultivators to get the work started. These supplies were the donation of the National War Garden Commission—Lieut.-Col. Edmond Tompkins, quartermaster of the camp, received them in behalf of the men stationed there. He is heartily back of the move-

ment, and a fine large tract of almost 400 acres was promptly set aside for the first "real war garden" in the United States. With the example of Camp Dix before them as an inspiration it was believed that it would not be long before every army training camp in the country would be raising much of its own food "F. O. B. the Mess Tent Door."

At Camp Dix, Lieut. Champlin, of the quartermaster's corps, was placed in active charge of the war garden work by Col. Tompkins, with Capt. Wm. Bethke, subsistence officer, and Wm. Ryan assisting him. Capt. Bethke, who was born in Germany, set out a "baby garden" of his own to serve as a model for the larger one. Bethke and Ryan—both equally enthusiastic over the war garden, working side by side to help America and the Allies win the war—that's the reason the American Army is going to see this war through to a finish,—that's why it's going to win the next war now.

Col. F. B. Beauchamp, of the British army, who recently visited a number of the army camps in this country, pointed out to the American officers some of the advantages of having the soldiers plant gardens. These benefits agree precisely with those which the National War Garden Commission has used in urging home food production. He emphasized the transportation problem and the saving effected to the railroads, with thousands of freight cars thus released for other work. At the camps, too, much fertilizer is on hand, at the stables and the short haul to the garden does away with the necessity of having it carted or carried on cars to farms or more distant points.

As an illustration of the gain from putting "slacker land" to work in this way, Col. Beauchamp stated that many tracts had produced food in excess of the value of the land itself. The cases which he cited are not unique, nor indeed unusual, for a number of reports have been made to the Commission where land

Photograph by La Tour

BABY WAR GARDEN FOR SOLDIERS AT CAMP DIX

Capt. William Bethke in his baby war garden at Camp Dix, New Jersey, which will serve as a model for the 400-acre garden to be planted to provide the boys with thousands of bushels of corn and potatoes, and to give an example to the people of the country as to what your Uncle Sam can do in raising food F. O. B. the kitchen door. The National War Garden Commission, of Washington, sent nine truck loads of seed and implements to the Camp for the garden work.

Photograph by La Tour

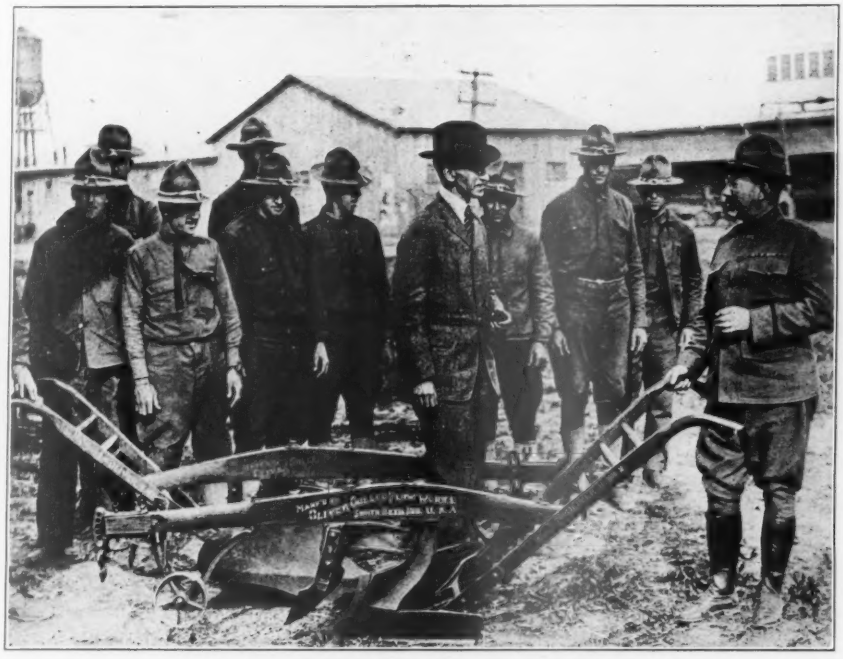
SOLDIER BOYS TO BECOME GARDENERS

Lieut. Champlin (right) gets the boys at Camp Dix busy unloading the trucks of seeds and implements given them for war gardening by the National War Garden Commission. A tract of 400 acres is being put under cultivation to provide "Food F. O. B. the Mess Tent Door."

in this country, which had been abandoned as valueless and held as of no worth, has grown crops which in a single season would more than pay for the tract.

With the shining example before them of the fighters for democracy, the men of France, England and the American Army helping to feed themselves, there should come to every war gardener in the United States a new thrill of patriotism and a new determination which will cause him to say: "I will redouble my efforts. I will raise more; I will save more. I will make my garden raise every bit of food that it is possible to raise there and I will see to it that none of the surplus is wasted. If our boys can help to feed themselves, as well as fight, so that those of us at home may have peace and freedom and happiness, I cannot do too much for them. Our American soldiers deserve my best effort and my complete co-operation."

Canada is going in for war gardening this year in the same manner in which the Canadian boys have gone into the fray "over there." Canada wanted to learn more of the campaign in the United States and of how the movement had spread so rapidly. As a result of numerous requests from the Dominion for information on this subject, both from official and unofficial sources, H. D. Hemenway, representing the National War Garden Commission, made a tour of the principal cities of Can-



Photograph by La Tour

ALL RIGHT BOYS! ALL FARMERS GET IN LINE!

Col. Edmond Tompkins is telling the boys at Camp Dix to get ready to show the war gardeners something, as he inspects the plows given with nine truck loads of seed to the Camp by the National War Garden Commission of Washington, to plant a 400-acre tract of land.

SEEDS of VICTORY for SOLDIERS' GARDENS
for the WAR GARDEN of the NATIONAL ARMY
CAMP DIX, N. J.
The National War Garden Commission
CAMP DIX, N. J.

Photograph by La Tour

YOUR UNCLE SAM TO GARDEN AT ARMY CAMPS

Here is the first of a train of trucks getting away from Camp Dix, New Jersey, loaded with seeds and implements for the war garden to be planted at the Camp—a tract of 400 acres. Your Uncle Sam is going in for gardening and "Food F. O. B. the Mess Tent Door" on a wholesale scale so the Commission started the biggest garden demonstration in the country as an example to the "city farmer" in its campaign for food F. O. B. the kitchen door.

ada, conferring with those in charge of the plans for the home food production work. There should be no limit to the war gardener's activity. As President Wilson said in regard to the number of American soldiers who are to go to France, there must be no limit, there must be enough to win, whatever that number be. "I have asked Congress to name no limit," he said, "because Congress intends, I am sure, as we all intend, that every ship that can carry men or supplies shall go laden upon every voyage with every man and every supply she can carry."

The men will be there and ready. The people of the United States, those of us who stay at home, must help to furnish the supplies which are to go on those ships. The war gardeners must help to supply the food, which will be needed in ever and ever increasing quantities as the ships continue to go laden upon every voyage with every man they can carry. *Food must follow the flag,* and trailing those men must go long stretches of smoke from other ships laden with supplies. The soldiers are helping to feed themselves. They are as ready to dig garden trenches as to dig the other trench, which is part of their job.

Reports to the National War Garden Commission from all over the United States are most encouraging. They show that the war gardeners, the home "Soldiers of the Soil," are doing a wonderful work and that they are performing a patriotic task of which they can ever be proud. But let the inspiration of the boys at the camps raising their own peas and beans and potatoes be an added incentive and make every war gardener dig just a little longer and go "over the top" to a glorious finish. *Let's win the next war now.*

NEW NATIONAL FORESTS IN THE EAST

PRESIDENT WILSON has issued a proclamation establishing three new National Forests in the East—the White Mountain, in Maine and New Hampshire, the Shenandoah, in Virginia and West Virginia, and the Natural Bridge in Virginia.

Proclaiming the Forests is the final step in carrying out the law for building up eastern National Forests through the purchase of lands in the mountains. Ever since the law was passed in 1911 the Government has been engaged in acquiring lands about the headwaters of the principal rivers, both in New England and in the Southern Appalachians. As the lands are bought or contracted for they are put under administration as "Purchase Areas" pending the time when their accumulation has reached a point justifying the proclamation which gives the lands their final status. The Pisgah National Forest, in North Carolina, and the Alabama National Forest, in Alabama, are the only eastern areas which had received this status before the new proclamations were issued.

The White Mountain National Forest is located in Grafton, Carroll and Coos counties, New Hampshire, and Oxford county, Maine. The Government has actually taken title to about 267,000 acres and in addition about 124,000 acres more have been approved for purchase, making a total of about 391,000 acres under Federal protection. This Forest protects in part the watersheds of the Androscoggin, Saco, Connecticut and Ammonoosuc rivers. The White Mountain region, long famous as one of the most important recreation grounds of the Nation and located as it is in close proximity to the most densely populated portion of the country, has great value not only for the protection of streamflow and the production of timber, but also as a public playground and is administered with a view to its use for all three purposes.

The Shenandoah National Forest is situated in Rockingham, Augusta, Bath, and Highland counties, Virginia, and Pendleton county, West Virginia. The Government has acquired to date slightly in excess of 100,000 acres, and an additional area of approximately 65,000 acres has been approved for purchase, making a total of approximately 165,000 acres under Federal protection. The Forest is for the most part on the watershed of the Shenandoah River and it also protects a portion of the watersheds of the Potomac and the James. On the area and still intact are trench systems constructed during the Civil War under the supervision of Stonewall Jackson.

The Natural Bridge National Forest is situated in Rockingham, Nelson, Amherst, Botetourt and Bedford counties, Virginia. The Federal Government has actually acquired title to a little over 73,000 acres, and an additional area of approximately 29,000 acres has been approved for purchase. The Forest, which protects a portion of the watershed of the James River, does not include the Natural Bridge, but this scenic feature is within three or four miles of the boundary. It is expected that visitors to the region will take advantage of the splendid opportunities which the Forest affords for recreation and outdoor life in the mountains.

SENATOR Chamberlain of Oregon has introduced in the Senate a bill adding certain lands to the Minam National Forest. These lands are heavily timbered and control the outlet to about 200,000,000 feet of timber inside the forest. The local public desires them for the reason that they practically control a stock driveway necessary to reach the National Forest range.

THROUGH the death of Charles Warren Fairbanks, of Indiana, conservation has lost a staunch friend. Mr. Fairbanks was ardently interested in the progress of forestry. He founded the Indiana State Forestry Association, and so solidified and strengthened forestry interests in that state, and he was for many years an active member of the American Forestry Association.

PITCHER-PLANTS—WHAT ARE THEY?

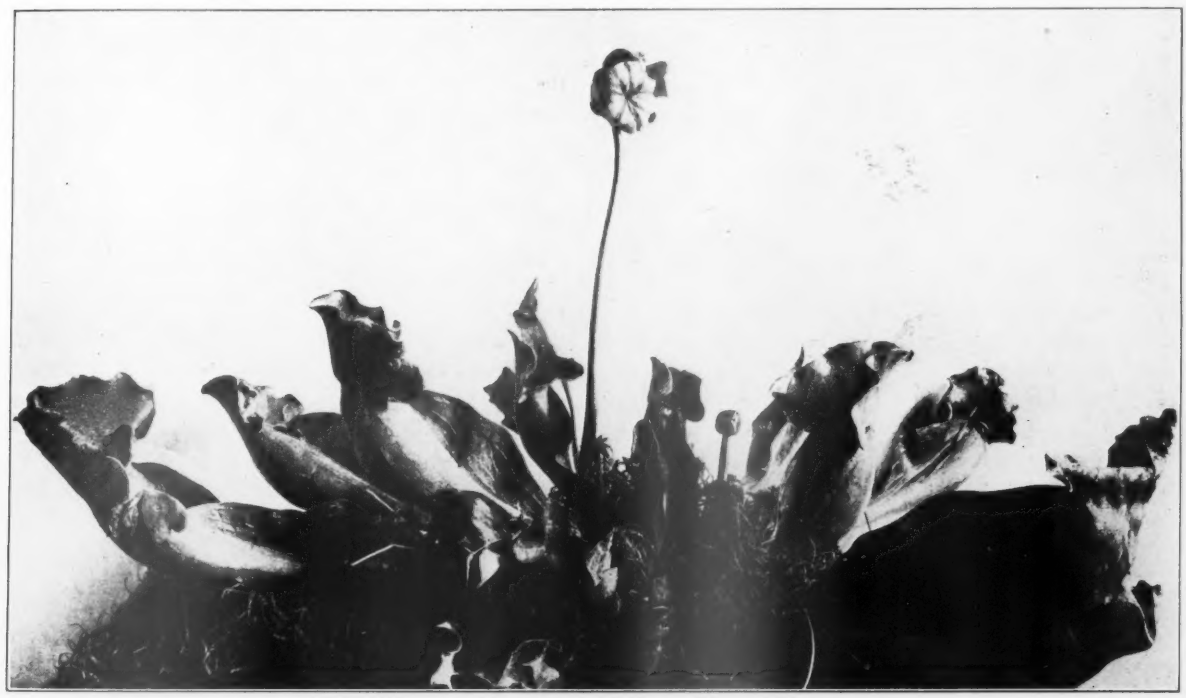
BY DR. R. W. SHUFELDT, C. M. Z. S.

(PHOTOGRAPHS BY THE AUTHOR DIRECT FROM SPECIMENS)

IT would seem that throughout the world every group of plants, and every group of animals, contains within it at least one peculiar form that, from its very oddity, attains a prominence, and comes to enjoy a notoriety not possessed by any of its congeners. Take mammals, for example. Very few people there are who ever heard of a shrew, or who would much less recognize one were they to see it; but upon the other hand, through the great number of illustrated accounts that have appeared about it, a host among us have at least heard of the curious duckbill of Australia—a mammal that has a bill like a duck; wears a poisonous spur upon either hind leg, and lays an egg like a bird, from which its young come forth. So, too, with birds. Most people know something of the natural history of an ostrich and would at once recognize the bird—yet hardly any one ever heard of a fin-foot. Similar examples could easily be cited with respect to reptiles, fish, and all the lower forms of life. Among plants the same holds true. Thousands of people will, without hesitation, describe such flowers as the common white daisy, or red clover, or cat-tails; yet never in all their lives have they heard of such a plant as the pitcher-plant and its near allies, with its curious flowers and still more curious leaves.

Upon referring to the technical works of those who have given us authoritative treatises on American botany, we find that such a group as the Pitcher-Plant Family (*Sarraceniaceae*) has been described, and that this family has arrayed in it but one genus (*Sarracenia*), which was created to contain the only two known species of pitcher-plants in our United States flora, east of the Mississippi. Most people, in any way familiar with these plants, call the first of these the pitcher-plant, and, occasionally, "huntsman's cup," as well as "side-saddle flower." Botanists have named it *Sarracenia purpurea* on account of its deep purple flowers, while the generic name I believe Linnæus is responsible for, it having been given in honor of Dr. Michel Sarrasin, who first sent the pitcher-plant of our Northern States to Europe. Sarrasin, early in the eighteenth century, was physician at the court of Quebec.

Now, our second species of pitcher-plant is known in the South simply as "Trumpets" (*S. flava*), it blooming in April in the boggy swamps of Virginia and southward. As its scientific name indicates, its flowers are yellow instead of purple, like its Northern relative.



A FORM JUST A BIT OUT OF THE ORDINARY
Fig. 2—One having wide spread and short flower stem.

Out West they have a pitcher-plant of their own, and it occurs only in certain parts of California. This species belongs in the genus *Darlingtonia,* and is rarely, if ever, seen in Eastern America. Down in South America we know of still another species; it occurs in Guiana. Others may have been described, but I have never heard of them. They are all bog plants, and to collect the best specimens of them anywhere, one generally has to resort to some wading; though, in certain instances, they may flourish in swamps where the bottom is firmer.

The Northern pitcher-plant presents all the remarkable peculiarities of the genus, and it is the one selected for description here. Its cup-like leaves are never a yard long, as is sometimes the case with the Southern plant—a fact which, in all probability, is responsible for the vernacular name of "trumpet," which has been applied to it and passed along to its more modest relative.

For miles around most of our Northern cities, the pitcher-plant is now nearly entirely extinct, in its wild state. This has been brought about by its having been, for many years, collected in great numbers for private ponds and decorative purposes in homes. It is easily pulled up, roots and all, and transplants readily. This being the case, people delight in gathering a few of them to place in shallow trays with moss and water, making veranda ornaments of

CHARACTERISTIC VARIETY

Fig. 5—Various forms of leaves of pitcher-plants, transplanted to indoors receptacles; the pitchers gradually disappear.

them. With due care they will thrive under such treatment for an entire summer. Finally, after the advent of the automobile, many could visit the more remote peat-bogs and swamps with ease, and thousands of pitcher-plants were pulled up by the roots by such vandals, simply to make, in any particular instance, a big bunch of the flowers. Altogether too many of our wild flowers are being exterminated at the present time in the same manner; but, fortunately, the plant is wonderfully abundant in some districts. For example, far from towns and cities, it is sometimes found growing in great profusion in the boggy pools along railroads and highways, and in such localities one may find specimens of all of the many forms it assumes. By this I mean that some of the plants will be found to be very small and dainty, while others will be large, coarse and spreading. Still others will have the flower-stems very tall, while in some they are short and inconspicuous.

THE FLOWER-HEADS

Fig. 1—Six perfect flower-heads of the pitcher-plant.

Very rarely is the upper end of the root of the pitcher-plant extensive, while from it spring all the stems of the leaves as well as flower stems. I have never found more than two or three of the latter on any one plant—in one hundred per cent of the plants in any bog the stem is single, with its upper end bearing the single flower. These characters are well shown in several of my illustrations, particularly in Figures 2 and 4.

Usually, the flower-stem ranges in length from a few inches to a foot; never have I found one any taller than that. It is subcylindrical in form; moderately slender; sap-green in color; often straight, but sometimes exhibiting various moderate flexures (Fig. 1). I have not yet met with a stem having more than one flower at its upper end, and almost invariably the face of the flower looks downward at a moderate angle. Neltje Blanchan, who claims to know of pitcher-plants that had stems two feet in length, says that the flowers "are solitary and nodding," while all those collected by me were very firmly attached to the ends of their stems. That the flower can be as much as two inches in diameter, is in agreement with my own observations. Her figure of the plant is a marvelously handsome specimen; but it seems to be no more than two plants having a common root below, with an unusual number of flower-stems springing from them. Sometimes a single plant will spread tremendously in an horizontal direction—the "trumpets" being larger and larger the further they are removed from the center; in such cases the flower-stem may be of no great height (Fig. 2).

It is not altogether an easy matter to describe the flower of the pitcher-plant without employing the scientific terms of the professional botanist; so it is all the more fortunate that I had such a wealth of material at hand when I came to make my photograph of these flowers, which is here reproduced in Figure 1. A glance at that array of beauties should be quite sufficient to give one a very correct idea in regard to the form, size, and coloration of the flower

of our Northern *Sarracenia*. The lowermost of all these specimens is down in the left-hand corner; it is not a perfect flower, but it shows very beautifully the pale, greenish ovary at the center of its anterior aspect,

PERFECTION

Fig. 3—Form of perfect leaves.

surrounded by the five broad, purplish and green-mottled sepals. There are three little bracelets at the bases of these, but they do not show in the cut. Next to this example, and directly above it, we have a perfect flower of this pitcher-plant. It is seen upon a slightly oblique anterior view. The broad, fiddle-shaped petals—five in number—lap over each other and hide the ovary. Surrounding them, we may again see the big, overlapping sepals. The tallest flower seen in this group shows one upon direct lateral view. Here the ovary is out of sight, overshadowed by the beautiful, subhemispherical, umbrella-like style, which is of a fine pea-green color, marked with shallow grooves radiating from its center. In the specimen to the right of this one, we are to note that this green style is of a conical form, which is of extremely rare occurrence. The flower immediately below it, in the lower right-hand corner, is the oldest in the group; its sepals are a bit ragged, while the style is almost ready to drop off.

But the great wonder of the pitcher-plant is its leaves—not its flowers. Figure 3 clearly shows two of the former in the foreground. Each leaf springs from the center of the plant by a stem of moderate proportions; this gradually expands and imperceptibly merges into the so-called pitcher-like leaf, the formation of which has in time come about by the complete sealing together of the upper surfaces of the proximal two-thirds of the marginal portion of the leaf. This forms a raised *keel* of greater or less width on the side toward the stem of the plant (Fig. 2). Distally, the remaining third of this curious structure is formed into a fluted, open spout, outwardly continuous with the general surface of the bowl, the opening being toward the center of the plant or flower-stem. Young leaves or "pitchers" are generally of a pale green color, sometimes finely veined with red; older leaves are a much darker green, beautifully, as well as generously, veined with dark purple.

There is considerable variance in form among the leaves; as they attain the required size, these hollow, trumpet-like affairs fill with water during every rainstorm. This largely evaporates, leaving the receptacle half-full. Externally these cups are smooth, while internally they are lined with fine bristles, pointing downwards. There is also a sticky, sugary sort of semi-fluid substance to be found around the inner margin of the bowl or pitcher. This arrangement not only attracts a large number of tiny insects, but they are so eager to feast upon the sugary substance that not a few of them tumble into the water below and die there. They cannot fly out for the lines of flight would be practically vertical, while the hundreds of little bristles confronting them prevent escape over the surface by walking out. Many believe that the plant, through its leaves, absorbs digestible parts of these insects, and that they thus contribute to its nutrition,—in other words, that the pitcher-plant is, to this extent, one of the carnivores of the vegetable kingdom. There is one fact appreciated by the entomologist; he often finds some rare little insects among the victims of the lures of this fatal well of the pitcher-plant leaf. Dr. L. O. Howard has stated that the larvæ of the mosquito are sometimes found in these wells. Sometimes one of the leaves, with its red veins and general raw-beef appearance, associated with the carrion-like odor of the contents of its concavity, attracts numbers of carrion flies; these specimens are, as a rule, especially fitted for the cross-fertilization of the flowers.

THE ROOT GROWTH

Fig. 4—Characters of the roots; a small plant complete (to the right), with rambling roots.

The leaves change very materially in several respects if the plants are kept in the house, and do not receive much sunlight. I made some experiments along this line, and I found that the leaves not only diminished much in size, but varied greatly in form. As to color, they generally became a clear, pale green, with little or no perceptible veining. The most curious and interesting thing was, however, to see the hollow pitcher-part gradually become absorbed, almost entirely disappearing

in some specimens. Figure 5 shows several of these metamorphoses.

Pitcher-plants bloom during June and July; but the leaves remain intact so late in the autumn that sometimes the water in their hollows has frozen nearly solid.

Miss Lounsberry, in her "Guide to the Wild Flowers," says: "These leaves often remain a curious feature of swamp life until Jack Frost covers them with his white

OUR WAX WINGS DEFER THEIR MARITAL DUTIES UNTIL MID-SUMMER IS AT HAND

Fig. 6—A pair of Cedar birds in June; reproduction of a photograph from life. They are resting on the naked twig of a sweet gum tree.

overcoat; but in the exquisite spring bloom is when the flowers are most ravishing in their beauty. From a distance they appear like the mystic blending of colors in a Persian rug" (p. 47).

For several years I made a vain search for a marsh or swamp within four or five miles of Washington, in the hope of finding a few pitcher-plants flourishing as they did long before man trespassed upon their preserves. During the spring of 1917 I came to the conclusion that the plant had been exterminated in the District of Columbia, and would probably never be found there again in its wild state. Then reports began to come to me that they were flourishing, in more or less abundance, in a great marsh some fifteen or twenty miles from Baltimore, and to that point, with my wife as my companion, I duly repaired upon a mid-summer's day. Fortunately, a man living in the neighborhood knew the exact locality of the swamp in which the plants were to be found, as he had acted in the capacity of guide for a "professor from Johns Hopkins University, who was searching for pitcher-plants some two years ago." He gave me very explicit directions where to go; and, after a long tramp, with a heavy pack consisting of a large camera and collecting outfit, we passed through the scrubby and rather dense undergrowth of a slope that apparently led to the margin of a big marsh several acres in extent. Owing to previous disappointments, I felt by no means sure that I would be rewarded by even a glimpse of the object of my search. I was afraid that all the beautiful accounts I had read of the thrill one experiences upon coming for the first time into "some spongy spagum bog," and beholding these glorious

A CURIOUS REPRESENTATIVE OF THE MILKWEED FAMILY

Fig. 7—Known as the Milkweed, as it is often found growing in sandy fields. Gray describes this plant as *A. amplexicaulis*, and it has received different scientific names from other botanists, it being the *Asclepias obtusifolia* of Michaux.

wonders of the plant world, was not to be experienced by me. This idea had hardly begun to gain possession of my mind, when, with unexpected suddenness, I came upon the edge of this great marsh, and almost at my feet there grew, in all of its magnificence, a most superb specimen imaginable of old *Sarracenia* itself. While looking up from the ground where I was picking my way, I was enabled to get a pretty good view of the great, mossy swamp that I had come to; and here and there, among the

trees and shrubs that grew in it, were to be seen, in all their glory, more than a hundred pitcher-plants, as they arose from among the masses of swampy vegetation, where they flourished as their ancestors did for ages before them. It was a most entrancing sight—one that I enjoyed to the fullest extent. Several hours later we landed home, after some interesting experiences, with an elegant bunch of the objects of a long summer day's expedition.

Students of flowers in the northwestern sections of our country, as far south as the Virginias, will note, while out on trips for specimens during the month of June, that practically all the small, ordinary land birds are entirely through with the rearing of their young—the latter being, in many species, nearly as large as their

THE WHORLED OR GREEN-FLOWERED MILKWEED

Fig. 8—The daintiest species of the entire group. This exquisite milkweed is found growing in the uplands; it is here associated with half a dozen specimens of the milk pea (*Galactia regularis*).

parents by then. Some species, however, which raise two —sometimes three—broods to the season, may be incubating the clutches laid during this month. This is a different matter from the bird that presents the regular and very rare habit of not even beginning to think about building its nest until the first week in June comes around. Few American passerine birds have this rare habit, and one of them is the well-known Cedar Bird or Cedar Waxwing (*Bombycilla cedrorum*), a pair of which

species is here shown in Figure 6. Space will not admit of giving even a brief sketch of this elegant bird here—one of the most beautiful in the United States; but the temptation to do so cannot be altogether resisted, and the following lines from the charming and very full life-history of this species by our most cultured ornithologist, Alexander Wilson, will not come amiss. He points out that "During the whole winter and spring they are occa-

WHERE THE LEAVES ARE MUCH THICKER ON THE STEM OF THE GREEN MILKWEED

Fig. 9—This is the middle third of the stem of the Green Milkweed shown in Figure 8, with two more flower-heads of others that grew near it.

sionally seen; and, about the 25th of May, appear in numerous parties, making great havoc among the cherries, selecting the best and ripest of the fruit. Nor are they easily intimidated by the presence of Mr. Scarecrow; for I have seen a flock deliberately feasting on the fruit of a loaded cherry-tree, while on the same tree one of these *guardian angels,* and a very formidable one too, stretched his stiffened arms, and displayed his dangling legs, with all the pomposity of authority. At this time of the season most of our resident birds, and many of our summer visitants, are sitting, or have young; while,

even on the first of June, the eggs in the ovary of the female Cedar Bird are no larger than mustard seed; and it is generally the eighth or tenth of that month before they begin to build!"

There is something about Wilson's descriptions of birds that compels the reader to regard him as the most fascinating of all the ornithologists that have essayed to present life-histories of our United States species. Moreover, he scorned any attempt to give an added interest to his sketches through the incorporation of truthless and extravagant incidents and statements.

Two species of milkweed are found during the month of June in certain sections of eastern United States, which were not described in the article on those plants that appeared several months ago in AMERICAN FORESTRY. One of these is the Sand Milkweed, here shown in Figure 7, a very interesting variety, the flowers of which have a great attraction for the smaller kinds of bumble-bees. The other is the Whorled or Green-flowered Milkweed (*A. verticillata*), the most delicate species of the entire genus, of which Neltje Blanchan says: "Compared with some of its rank-growing, heavy relatives, how exquisite is this little denizen of the uplands, with its whorls of needle-like leaves set at intervals along a slender, swaying stem!" These "whorls" are best seen on the lower half, or the middle third, of the stem, which is shown in another cut (Figure 8). Its flowers are distinctly of the milkweed type; and altogether it is a wonderful little plant, fully deserving of close study on the part of the collector.

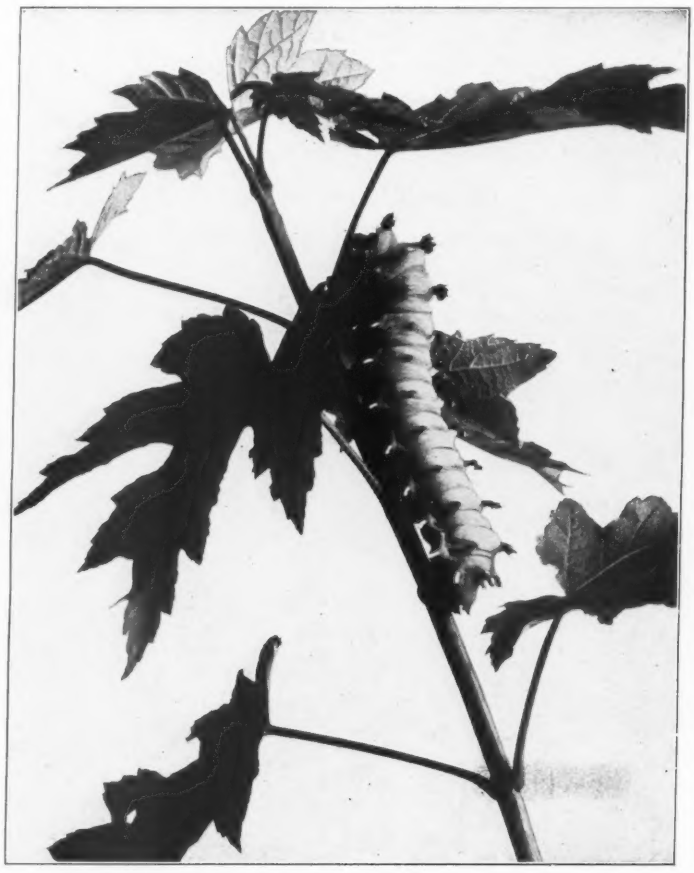


FIG. 1—THE LARVA OF THE CECROPIA MOTH, FEEDING ON MAPLE LEAVES.

Some of the Pea or Pulse family (*Leguminosae*) also flower in June, and among these we find, growing in sandy and dry situations, along the edges of pine woods, the common Milk Pea (*Galatia regularis*), the flowers of which, with a sample leaf, are here associated in the figure of our Whorled Milkweed. Gray describes the Milk Pea as "Low, mostly prostrate or twining perennial herbs," and they get their name of Milk Pea from the fact that some of them are said to yield a milky juice, which was not the case in the plant here shown. The very slightly hairy pods of this Milk Pea are well shown in the cut, as well as the form of the leaf, the specimen having been collected near Washington during the summer of 1917, as was also the Whorled Milkweed. Either may be found in flower in this locality during the lovely month of June, at a time when there is such a wealth of summer flowers throughout all this part of the country.

Our Cecropia Moth.

Wherever butterflies and moths are found in numbers in any part of the world, there is sure to be, in either group, from one to many that are far larger and more conspicuously colored than the rest. In North and South Temperate latitudes there may be only a few such species; while, as we enter the mid-tropical zone of the world, the number of those of large size and those of gaudy coloration greatly increases.

In the United States there is an enormous array of butterflies and moths in her fauna, and, as in the case of birds, mammals, and still other groups, they vary with respect to habitats. That is to say, on the Pacific coast we find members of both groups that do not normally occur in the East, and so on for our northern and southern species. As illustrative of this, in so far as our large and handsome moths are concerned, it may be pointed out that, while we have such species in the East as the big Cecropia Moth to which this article will be devoted —we likewise have in Arizona the equally large and elegant Orizaba Silk-moth (*Rothschildia orizaba*). The western limit of the range of the first lies along the eastern margin of the great plains; while the latter, in so far as the United States is concerned, has not been found beyond the limits of the above named State. Numerous other instances of this kind might easily be cited.

In the case of the eastern species, the Cecropia Moth is scientifically known as *Samia cecropia,* while its near relative, the Columbian Silk-moth (*Samia columbia*), may be collected over its range which extends from Maine to Wisconsin, southward to the forty-first parallel of latitude. Then there is the dwarfed species, Glover's

Silk-moth (*S. gloveri*), of Colorado, and the Ceanthus Silk-moth (*S. rubra*), of the Pacific coast country, eastward to Wyoming and Utah. Possibly there may be other species discovered and described since 1903, and the fact not have come to my knowledge.

Many other superb species are, however, to be found inhabiting various other ranges of the country; they represent a number of families and genera, some of them being more or less nearly related to the Cecropia. Be this as it may, no single species is more abundant or more frequently seen than this same species throughout the Atlantic States; though, notwithstanding this fact, not one person in a thousand knows it by name. In this connection Doctor Holland says: "This splendid moth, which is very common, is one of a small number of our native silk-moths, which attract more or less attention, and the spring of the year in our museums is always regarded as a period in which a certain portion of time of the entomological staff will be consumed in replying to the letters of persons who, having for once opened their eyes to the wonders of the insect world, have sent in old match boxes through the mails specimens of this insect, generally adding the information that the species is probably 'new to science' or 'excessively rare,' they having for the first time in their lives noticed the moth" (Moth Book, p. 83).

FIG. 2—A COCOON OF THE CECROPIA. THE COCOON IS USUALLY A LITTLE MORE ELONGATE THAN THIS, AS SEEN IN FIGURE 3.

FIG. 3—ANOTHER COCOON OF THE CECROPIA; IT IS WOVEN TO A TWIG OF A PINE-TREE, WHICH WILL ACCOUNT FOR ITS BEING DECORATED WITH "NEEDLES."

Such people as Doctor Holland here describes have never asked themselves the question as to what constitutes the chief differences between an average moth and an average butterfly, or how either comes into existence; yet the answers to such questions are by no means very difficult.

Disregarding the few exceptions there may be to the general rule, it may be said that butterflies are diurnal insects by nature,—that is, they fly about during the daytime and rest somewhere at night. Just the reverse of this habit pertains to the moths. Some of the latter are, however, diurnal by habit; and there are even a few species of butterflies which occasionally fly about after dark. Such a distinction is by no means definite for the purposes of exactitude and classification; for, as in the case of all other animals, we must resort to a comparative study of the structure of the forms in question in order to correctly classify them. Often a few structural points are ample for this,—that is, to throw them into one or another main group, and such is the case when we desire to determine whether the lepidoptera we have at hand are butterflies or moths. It may be said that the lepidoptera is the order of the Class *Insecta* that contains both the moths and the butterflies.

Nearly everyone knows what the *antennae* of these insects are. It will be remembered that they are the pair of little structures that project beyond the head of the insect in front. Now, in the vast majority of instances in butterflies, these are much longer than they are in moths —everything else being equal—more slender, with their distal ends enlarged (clubbed). These enlargements may be of an ellipsoidal form, more or less elongated; in some species the extreme distal extremity, of either one, is turned outwards as a little hook. Moths very rarely have such antennæ as these; they assume various other

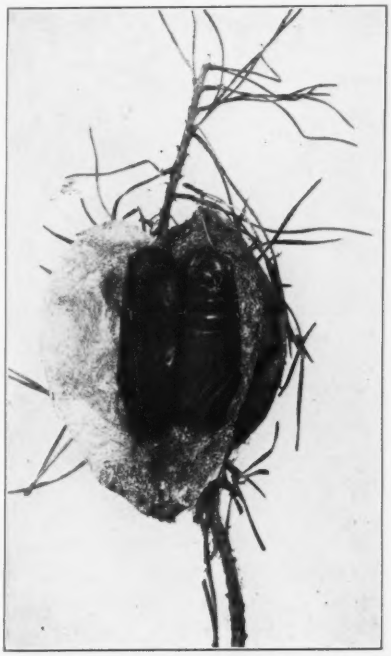


FIG. 4—THE SAME COCOON SHOWN IN FIGURE 3, LONGITUDINALLY CUT OPEN IN ORDER TO EXPOSE THE PUPA INSIDE.

forms, and these differ for the sexes. Some resemble a beautiful little feather; some are thread-like, or they may be prismatic in shape. As in certain butterflies, they may also be hooked at their ends. Many modifications of these patterns are to be met with and as a rule they are highly distinctive. Then the wings of butterflies are usually held erect, while those of moths lie flat when the insect is at rest.

The caterpillar of the Cecropia moth shown in Figure 1 is a very handsome creature. Like the caterpillar or larva of many another large American moth, it is of a brilliant green color. Several of the anterior segments are retractile, having ornamental outgrowths upon them —those on the three leading segments being beautiful little knobs of bright blue, roughened on their superficies by minute projections. These caterpillars generally feed on plants of the rose family, although they are also partial to maples, the willow tree, and lilac bushes. My photograph of one of them is on the twig of a maple tree, and given in the very attitude in which he was discovered.

Nearly everybody is familiar with the appearance of the cocoon that this big green caterpillar spins; but should it be otherwise with any one, a fine example of one is here reproduced in Figure 2. The moth shown in Figures 5 and 6 emerged from this cocoon after it had lain on my study table for two or three months. Its outside coat is very tough and extremely dense; within there is a silky, loose layer, which may be half an inch or more in thickness, the outer layer being very thin. Then, finally, comes the inner, tough case, with its smooth, shiny inner surface, which is the resting place of the pupa during its dormant stage. (Fig. 4.)

By no means does the larva of the Cecropia moth weave its cocoon on the twigs of a tree or shrub, upon the leaves of which it fed in the caterpillar stage. It is very difficult to tell what induces it to make the strange choices we sometimes see. On one occasion, dozens of them were on twigs of the alders that grew along the banks of a stream; at another time, thirty or forty were found in a big pine-tree. So, when the cocoon was woven, many of the pine needles were incorporated into the outer silken fabric of the case. (Figs. 3 and 4.)

Possibly the head of the future moth may always point towards the ground as it does in Figure 4; but we have not sufficient data on this point to warrant a positive statement being made in regard to it. Often, at the abdominal end of the pupa within the cocoon, may be found some dried and skinny remains of the larva or caterpillar, shed by it as it passed to the pupa stage. These remains are also seen in Figure 4, where the dark elliptical area to the left of the pupa is the shiny lining of the innermost case. There being much yellow in its coloration, it naturally photographed nearly black.

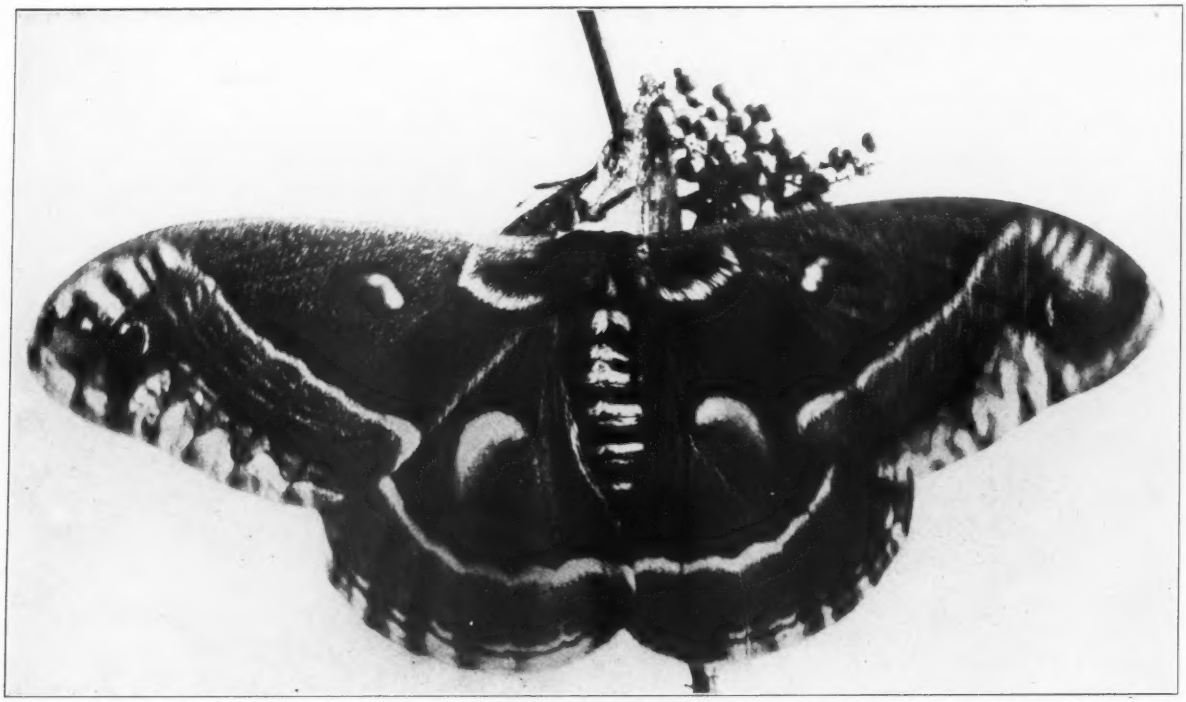


FIG. 5—AN UNUSUALLY HANDSOME FEMALE CECROPIA MOTH, RESTING ON ITS COCOON AND VIEWED DIRECTLY FROM ABOVE.

As an antenna of a male Cecropia moth is like a delicate little tan-colored feather—this being reduced in the female to a mere thread-like spine, flexible and soft—we can readily tell the sex of the coming moth in Figure 4, as that part of the case containing the left antenna is in plain view, and its feather-like form can be discerned.

A good example of the antennæ in a female Cecropia moth may be seen in Figure 6 of this article, where, too, is to be noted the enormous body of this example of the sex, it being due to the great mass of eggs it contains. In

color it is a bright vermilion, banded and striped with white. A row of six little vermilion dots occur upon either side, arranged as shown in the illustration. In the male the body is in proportion very much smaller, though the coloration is similar.

The entire metamorphosis is a most remarkable phenomenon, and no part of it is more so than the way this weak, soft, and tender moth succeeds in getting out of the dense, tough case in which its transformation was effected. In this it is materially assisted through the use of a very caustic fluid acid, which it is able to jet from its mouth upon the point where the emergence will subsequently be made. Experiments with this acid go to show that it will burn through not a few fabrics and other materials of great durability and strength.

The study of the eggs, the pupæ, larvæ, and the anatomy of the latter two, together with that of the moth itself is a very large subject, one that cannot be discussed in a brief article like the present one.

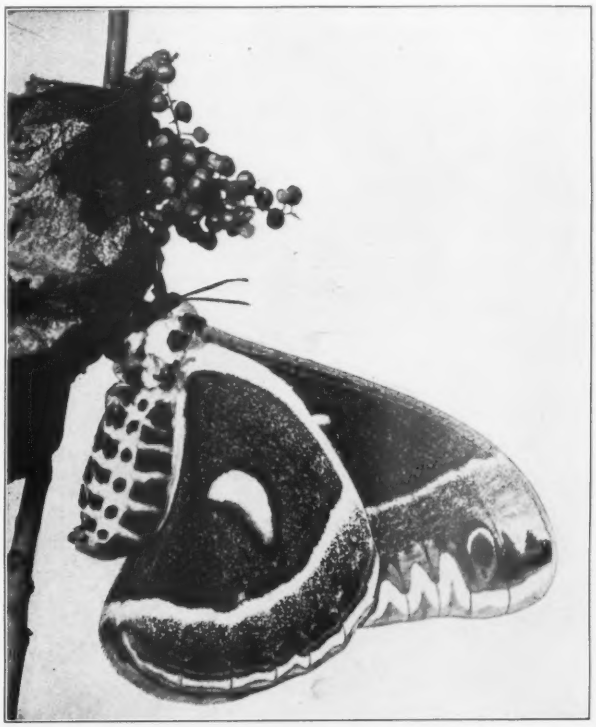


FIG. 6—THE SAME INSECT AS IS SHOWN IN FIGURE 5, SEEN UPON DIRECT LATERAL VIEW. NOTE THE THREADLIKE ANTENNAE AND THE EXQUISITE PATTERN OF THE WINGS.

In the Cecropia, the general upper surface of the superior and inferior wings is a rich, deep brown, of rather a deep shade. Anteriorly, on the upper wings, this is sprinkled with tan with extreme fineness. The anterior part of the body is bright red, which runs out on the wing on either side, where it is bounded with black and white, the former being the outer band. There is also a large kidney-shaped spot on either inferior wing, each being white, passing to red, to be bounded by a fine line of velvety black. A submarginal band of black, white, and red is carried clear around over all four wings, as shown in Figure 5. This is succeeded by a very complicated pattern, which is carried to the edges of the wings. The principal colors in this are black, purple, and pale tan. With slight change in pattern and distribution, these colors and their arrangement is repeated upon the under surfaces of the wings as shown in Figure 6.

The Cecropia is a representative of a very large family of beautiful American moths known as the *Saturniidae;* they are all cocoon-weavers, and most of the species are above the average size. This family contains the famous Polyphemus, the Luna moth, the Galbine moth, and not a few very beautiful other kinds, every one of which is well worthy of our closest study.

MUNICIPAL WOODYARDS LEGALIZED IN MISSISSIPPI

MUNICIPAL wood and coal yards have been made possible in the State of Mississippi by recent legislative action which authorizes towns and cities to establish and operate wood and coal yards to provide the inhabitants with fuel.

This authority is to be effective for the period of the war and not to extend beyond one year after the close of the war.

General municipal funds may be used for this purpose, but should these be insufficient the necessary money may be borrowed. In the latter case it is necessary to give general publicity by publication in the local newspapers of the proposed step. In the absence of any protest, the proposed fuel yards may be established at once; on the other hand, if protest is made by at least 25 per cent of the qualified voters, an election must be held, a majority vote in favor being sufficient to give approval and authorize the loan.

MILL OWNERS COOPERATE WITH GOVERNMENT

IN the desire to speed up the shipbuilding and airplane building programs of the administration, various branches of the government are continuing the production of certain kinds of wood for non-war uses.

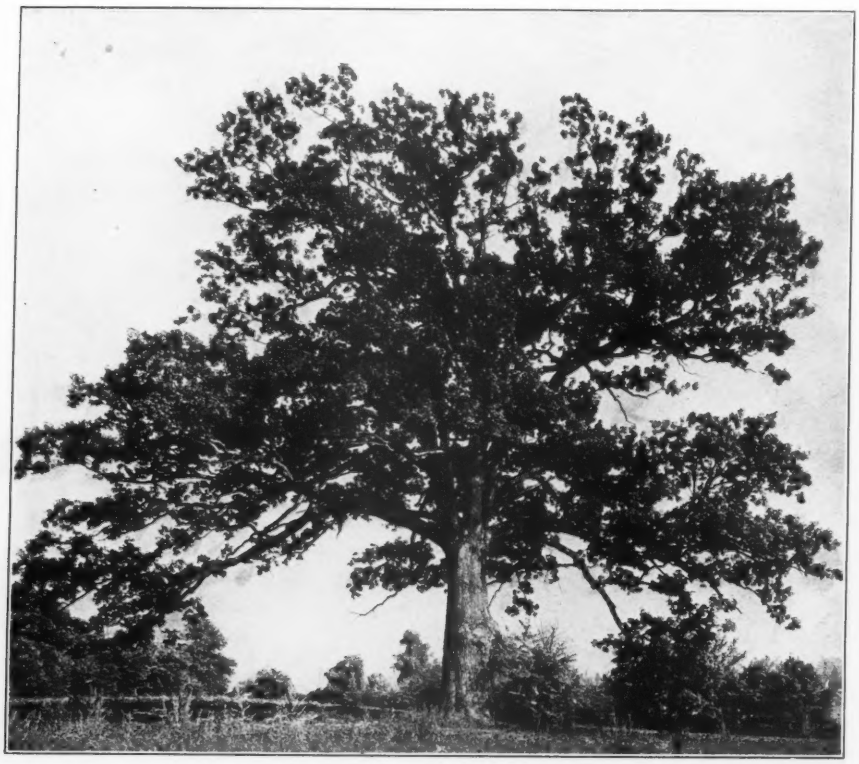
The latest development along this line is reported to be a voluntary agreement between the musical instrument industry and the War Industries Board for a curtailment of 30 per cent in the output of pianos, talking machines and other instruments during the next few months. Instead the musical instrument plants will be given contracts for the manufacture of airplane frames and propellors.

It is also reported that the Signal Corps is notifying veneer mills that no mahogany suitable for airplanes nor walnut suitable for gunstocks or airplanes be shipped for commercial purposes. The government is showing its confidence in the patriotism of the mill owners by stating this ruling in the form of a request rather than an order.

TWO FAMOUS TREES OF NEW JERSEY

BY ALFRED GASKILL, STATE FORESTER

FEW states are richer in notable trees, especially oaks, than New Jersey. The white oak in the Quaker burying ground at Salem is famous and bears the reputation of being the largest tree in the State. As a matter of fact, there are half a dozen oaks as large, or larger, and several other species no less in size.



THE GREAT WHITE OAK

The New Jersey trees are notable for the fact that many of them have been but little injured by time and are in full vigor. The largest tree known to the State Forester is shown in the illustration herewith. It is a white oak and stands in a field close to Mantua Creek about half a mile from the village of Berkeley in Gloucester County. Careful measurements made in May, 1915, give a circumference at breast height of 25 feet 7½ inches, extreme height 85 feet, or larger, and several of other species less in size.

Another notable tree is the Heuling's sycamore. The top has been badly broken by storms but the stem is perfectly sound and is notable for the fact that the tree has a single stem and is not formed by the union of two or more stems, as is so frequently the case in exceptionally large trees. It stands in a field about three miles northwest of Medford in Burlington County and two hundred yards from the road between Medford and Moorestown. Its dimensions are as follows: Circumference at breast height 21 feet 5 inches, height 75 feet, spread east to west 113 feet. The thin foliage shown in the photograph is due to an attack of fungus from which the tree has now entirely recovered. This is striking evidence of the hardiness of the Sycamore and its disease-resistant qualities.

Though these trees are found on ground of recognized agricultural value, the presence of others, chiefly white and red oaks, on what is often called sterile sand proves the capacity of South Jersey soils. In the village of Mays Landing, Atlantic County, for instance, twenty or thirty noble oaks are standing in the main street and in the vicinity of the Court House.

THE HEULING SYCAMORE

THE TRUE HAWKS

(Families Buteonidae, Falcondidae and Pandionidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

THE majority of the true hawks belong to the family Buteonidae and are variously known as kites, eagles, harriers, "buzzards" or "hen hawks," goshawks, and sparrow hawks or "chicken hawks." Both the terms buzzard and sparrow hawk are confusing because in America the former is used synonymously with vulture and the latter is applied to the smallest of the falcons. In Europe, however, the broad winged, fan-tailed hawks are called buzzards and the short-winged, long tailed hawks are called sparrow hawks.

Without reference to family divisions, there are four types of hawks according to the shape of their wings and tails and their corresponding food habits, and they may well be considered from this point of view.

1. The broad-winged, fan-tailed hawks. This group includes, among North American birds, the red-shouldered, red-tailed, broad-winged, Harris', Swainsons' rough-legged, and a few other hawks and the bald and golden eagles. With their broad wings and spread tails, they circle high overhead as do the vultures but, with the exception of the eagles, they are much smaller. In general, they live in wooded districts but do most of their hunting about open fields. They are all commonly spoken of as "hen hawks" and are supposed to be poultry thieves but, as a fact, this group of hawks feeds principally upon small rodents and the larger insects. The broad-winged and rough-legged hawks have practically a spotless record and the red-shouldered and red-tailed only rarely take birds or poultry.

The members of this group of hawks are most often seen soaring on high and are most easily identified by the pattern of dark markings on their underparts. Thus the broad-winged hawk has the under surface of the wings pure white except for the black tips formed by the dark first primaries. The red-shouldered hawk has the under surface of the wings barred but with no distinct black patch; the red-tailed has a distinct crescentic black mark at the "wrist," which in the rough-legged hawk, is very large and conspicuous.

The eagles are usually recognizable by their large size. The bald eagle was chosen as our national bird more because of its majestic appearance than because of its habits, for it feeds principally upon fish cast up by the waves or those which it steals from the osprey. Occasionally it takes crippled waterfowl. The adult birds have the white head and tail, as always illustrated, but the immatures have the head and tail brown like the back, requiring several years to attain adult plumage.

Photograph by Herbert K. Job

OSPREY AT NEST ON GARDINER'S ISLAND, NEW YORK

Some of the osprey colony here nest on the ground. This picture shows clearly the long, narrow wings typical of sailing birds which remain on the wing for extended periods.

A CAPTIVE RED-TAILED HAWK

This shows the powerful beak and the keen eye that make the birds of prey so fascinating.

In fact they are very similar to the golden eagle except in the feathering of the legs, the bald eagle having the lower tarsus bare while the golden eagle has the legs feathered all the way to the toes. The golden eagle is very rare east of the Mississippi, being most abundant in the mountainous parts of the West. It is a more active bird than the bald eagle and preys upon rabbits, grouse, young lambs and fawns. The stories told about its carrying off young children are highly improbable since it has been shown that the greatest weight it can carry is six pounds. Like the bald eagle, it sometimes builds a bulky nest of sticks in the top of a tall tree but, more often, it nests on ledges of inaccessible cliffs. In fact, all of these broad-winged hawks build very similar nests of sticks and lay similar spotted eggs, those of the eagles, of course, being larger.

2. The short-winged hawks. These include, of our common American species, the sharp-shinned, Cooper's and goshawk. They seldom soar and, when they do, it is in very narrow circles. Ordinarily one of these hawks chooses some inconspicuous perch and remains perfectly quiet until the disturbance which its arrival caused among the birds, subsides. Then, when the birds have forgotten its presence, it dashes from its perch, usually with successful aim. Sometimes it misses but, still determined, it follows its victim on foot through the brush. At other times, flying low through the woods or open country, it makes a sudden dash into a flock of birds without any preliminary waiting and, at such times, it is very bold and may strike birds within a few feet of one. During the past summer, on two occasions, a sharp-shinned hawk attacked birds within twenty feet of the writer and, on another occasion, one flew into the window of the house, after making an unsuccessful dash at some juncos at the feeding station.

The hawks of this group are the great bird destroyers and chicken thieves that have brought the whole family into disrepute. The sharp-shinned hawk, because of its small size, usually confines its attacks to pullets or young chickens, but the Cooper's hawk may attack anything up to full grown hens. The goshawk, which is a more northern species, coming southward into northern United States in winter, is the most destructive of all and, when it comes in big flights, as it does about every ten years when the rabbit supply in the north fails, it is a great menace. Such a flight occurred during the past two winters with the result that the grouse over most parts of northeastern United States were nearly exterminated. The adult goshawk differs from the other two species in the color of its underparts, these being gray, penciled with narrow black lines. The adults of all three species are dark slaty-gray above and the Cooper's and sharp-shinned hawks have the underparts barred with rusty brown. The immature birds of all three species are brown above and white below streaked with brown. The females are so much larger than the males that a female sharp-shinned is nearly as large as a male Cooper's. About the only safe way to distinguish the

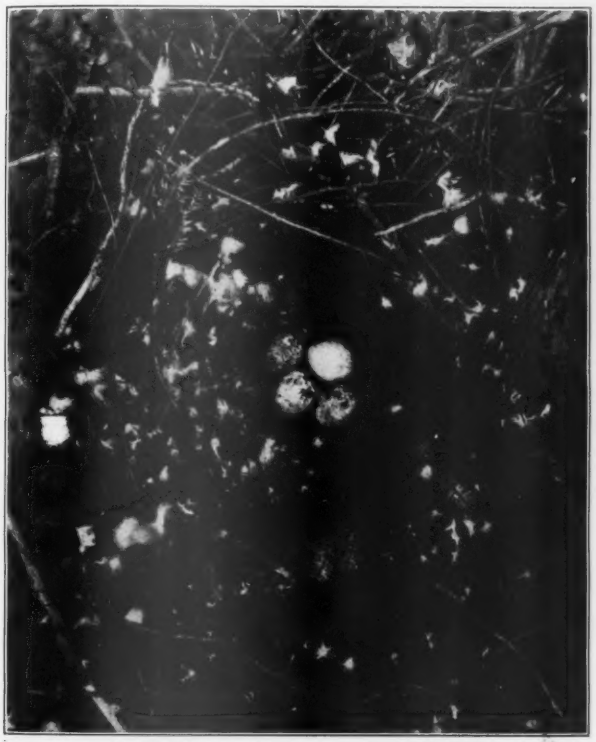
Photograph by Herbert K. Job

A BROAD-WINGED HAWK AT HOME

This nest was occupied the previous year by a Cooper's hawk and perhaps before it by a crow, as hawks prefer second-hand nests, which they merely refit with a lining of hemlock twigs, bark or green leaves. So far as birds or poultry are concerned this hawk has a spotless record.

two species is by the shape of tail which is square in the sharp-shinned and rounded in the Cooper's.

3. The falcons. These are perhaps the most striking and interesting of all the hawks. Although not of the largest size, they are the most powerful and, with the exception of the sparrow hawk, strike their victims in full flight. The gyrfalcons, of the far north, are the largest, measuring two feet in length; the duck hawk or peregrine falcon is next, and the pigeon hawk and sparrow hawk are the smallest. It was pre-eminently members of this family of hawks that were used in the days of falconry. The taming and training of hawks for sport was quite common in Europe by the end of the ninth century and in China it was practiced as early as 400 B. C. The name falcon was ordinarily applied to the females, the smaller males being called "tiercels."



NEST AND EGGS OF THE RED-SHOULDERED HAWK

Hawks lay white eggs that are usually heavily spotted with brown. Considerable variation occurs, however, and some of the eggs may be nearly pure white.

In the 16th century, falconry had become so universal that everyone who could afford to do so kept a hawk, and the rank of the owner, we are told, was indicated by the species which he kept. Thus, a king kept a gyrfalcon, a prince the falcon gentle, an earl, the peregrine falcon, a lady, the merlin, a young squire, the hobby. A yeoman carried a goshawk, a priest, a sparrow hawk, and a knave or a servant, a kestrel.

The gyrfalcons are northern in their distribution and must have been brought down from the Scandinavian mountains to England or the Continent. The European species is lighter and bluer than the American. The peregrine is almost identical with our duck hawk, and the merlin with our pigeon hawk. The hobby has relatively longer wings than the other falcons and has no representatives in North America. The European goshawk has a more distinctly barred breast and the European sparrow hawk corresponds to our sharp-shinned hawk, while the kestrel is very similar to the North American sparrow hawk.

Falcons nest on cliffs or in trees but seldom build

NEST AND YOUNG OF THE RED-SHOULDERED HAWK

Young hawks are covered with thick whitish down and look a good deal like little chickens. They lack the fierce natures of their parents until they are half grown when they make up for it.

nests of their own except just enough to keep the eggs from rolling. The eggs are laid either on the bare ground, in cavities of trees, or in the deserted nests of crows or other hawks, and are usually so heavily spotted as to appear uniformly brownish.

4. The long-winged hawks. The hawks having relatively the longest and narrowest wings are the kites, the marsh hawks, and the fish hawks, the last belonging to a separate family, Pandionidae, having very different habits. In fact about the only thing in common between the three is that they all have the power of long sustained flight and have developed the sailing type of wing.

The kites are the lightest and most graceful of all the hawks, being almost swallowlike in their flight. Particularly is this true of the swallow-tailed kite of southern United States and tropical America, a strikingly marked white and black bird, nearly two feet in length, whose swallow-like appearance is augmented by its deeply forked tail. The most beautiful and graceful sight that was ever my good fortune to behold was a troop of these birds skimming a tropical river like a band of swallows, darting after one another in playful

sport, rising abruptly hundreds of feet without apparent effort diving, sailing, reversing, absolute masters of the air.

The marsh hawk is quite a different looking bird, although light of body and long of wing. It is seldom found far from the marshes except during its migrations, although it does a great deal of feeding about open fields where mice are abundant. Occasionally it takes young ducklings or marsh birds but most of its food consists of meadow mice, frogs, snakes, etc. It can easily be distinguished by a white patch above the tail.

The marsh hawk nests on the ground, usually in the marshes but sometimes by stumps in upland pastures, and lays from five to seven pure white eggs. It seldom perches in trees, preferring some low perch on a fence post or on the ground. Occasionally, however, near the nest, it selects some high stub or dead tree from which it can keep a sharp lookout.

YOUNG SPARROW HAWK SHORTLY AFTER LEAVING THE NEST

He could not fly far and was easily tired out and made to sit for his picture. An aluminum bracelet was put on his leg to mark him before he was released.

During the mating season the male performs curious evolutions in the air, sometimes turning somersaults from a considerable height toward the ground or again "looping the loop" on an angular course across the marsh.

The fish hawk or osprey is most abundant along the seacoast but is found inland about most large bodies of water from the tropics to the arctic circle. With slight variations it is found all over the world. Unlike other hawks, it sometimes nests in small colonies, es-

THE HOME OF THE MARSH HAWK

The marsh hawk nests on the ground, usually in the marshes. Hawks are very difficult subjects for the photographer, but here the camera has caught the male bird when it returned to inspect the nest and shows well all the wildness and fierceness of its nature.

JUST HATCHED

One of the young marsh hawks is seen still between the fragments of egg shell which encased him.

THE NEST OF A SPARROW HAWK IN A CAVITY THIRTY FEET ABOVE GROUND

The eggs are laid on the chips at the bottom of the cavity without pretense of a nest. But this bears more resemblance to a home than in the average case, as the eggs are often laid on the bare ground.

pecially where food is abundant and where protection is afforded. Thus on Gardiner's Island, Long Island, there are about 200 of these birds nesting. It builds an enormous nest of sticks, usually on the top of a broken tree, although where protection is given them, as on Gardiner's Island, they sometimes descend to the ground or like the European storks, they build on wagon wheels raised on tall poles.

Fish hawks are sometimes confused with bald eagles because of their great wing expanse and the large white areas on the head. Unlike the eagles, however, their underparts are white and their tails dark. They feed entirely upon fish which they locate near the surface of the water, while hovering overhead and secure by plunging, often from considerable heights and spearing with their talons. The fish taken often weigh several pounds and there is a record of a hawk that pounced upon a fish too large for it to lift, and being unable to relax its talons, it was carried beneath and drowned. As before stated, the toes are placed two in front and two behind and the soles, moreover, are armed with sharp spicules for cutting through the slime and assisting in holding the slippery, squirming prey. The fish is carried lengthwise, usually to some high perch where it can be devoured.

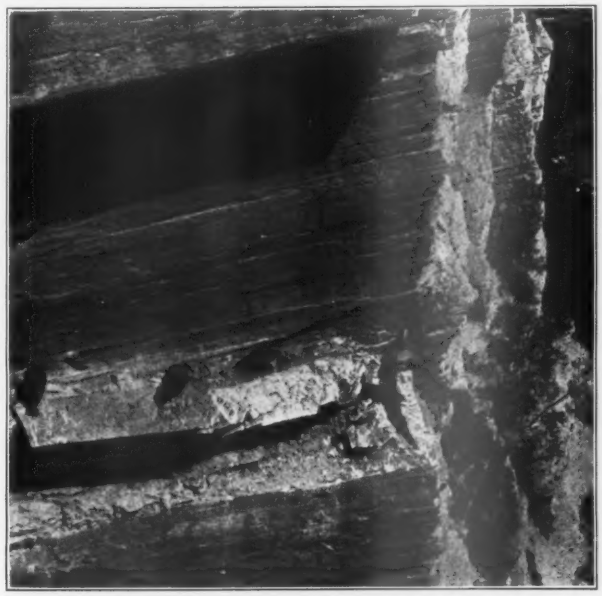
Fish hawks are sometimes quite destructive to spawning pike and pickerel but ordinarily, the surface feeding fish which they catch are of little value.

Taking the hawks as a whole they are a much maligned group of birds. The whole family is usually made to pay for the sins of a few, so much so in fact, that even today when most people are enlightened as to their value, we still hear a cry for bounties to be placed on their heads. No greater mistake could ever be made than to start a wholesale destruction of the birds of prey. There are undoubtedly areas of extensive poultry or game production where hawks are too numerous and should be thinned out, but taken the country over, they are as necessary as any group of birds.

Photograph by H. H. Knight

THE FALCON'S WATCH TOWER

This old hemlock was a favorite roosting place of the Duck hawks, and here is shown one of the immature birds after leaving the nest seeking the favorite perch of its parents.



Photograph by H. H. Knight

A ROCKY HOME ON A CLIFF

Duck hawks have nested on this ledge for years, 200 feet from the bottom of the ravine and 75 feet from the top. The old bird, casting her shadow, is leaving the three young on the ledge, after having brought them a pigeon.

THE USES OF WOOD FOR FUEL BY MANUFACTURING PLANTS IN MASSACHUSETTS

BY W. DARROW CLARK

PROFESSOR OF FORESTRY AT MASSACHUSETTS AGRICULTURAL COLLEGE, IN CHARGE WOOD CAMPAIGN FOR JAMES J. STORROW, FEDERAL FUEL ADMINISTRATOR FOR NEW ENGLAND

THE demand for wood from manufacturing plants located in every section of the State of Massachusetts has been more urgent than the demand from domestic consumers, on account of the greater shortage of bituminous coal as compared with the shortage of anthracite. Our most modern plants, even those equipped with stoker fired boilers, have used wood in considerable quantities. As an example of this, the Grafton & Knight Manufacturing Company, of Worcester, may be mentioned as having burned during the past winter approximately 30,000 cords, and they have stored up a large supply for use next winter in case of the emergency which will doubtless arise. The cost, in this case, of the substitution of wood for coal was almost two to one for wood against coal. However, it was only through the use of wood that the plant avoided the necessity of a total shut-down through coal exhaustion, and in accordance with their own report, this excess cost was insignificant when compared with the cost of shutting down under the prevailing conditions of orders on hand and labor employed.

"FORE-WARNED IS FORE-ARMED"

And the Grafton-Knight Manufacturing Company, of Worcester, Massachusetts, was not unprepared. Confronted with the possible necessity of substituting wood for coal, they made ready and met the need.

In regard to the comparative economic gain or loss as between the use of wood for manufacturing and domestic uses, there seems to be little difference, as the equipment in both cases is for burning coal and not wood. For this reason as many of the available heat units contained in wood are utilized by the manufacturing plant as by the domestic consumer and the necessary adaptations of furnaces for the more economical consumption of wood are more likely to be installed by the manufacturing plant than by the domestic consumer. Furthermore, the manufacturing plant can utilize the wood to best advantage in 4-ft. or cord lengths, while for the domestic consumer the 4-ft. length must be cut at least once, and usually twice. Generally speaking, the wood is also just as accessible to the manufacturing plants as it is to the domestic consumer. Again, the manufacturing plant can readily purchase the wood in carload lots by rail and hauling 100 to 150 miles is certainly less costly than hauling by sled or wagon load from three to five miles. Again, this would work out in favor of the use of wood by the manufacturing plants as an economical proposition, when sufficient quantities of coal to keep the plant running are obtainable, but it is to be maintained that for plants running under the pressure of heavy orders it is much more economical in most cases to use wood to stretch out their coal supplies rather than to shut down on account of coal exhaustion.

As the annual consumption of bituminous coal by manufacturing plants in Massachusetts amounts to some 20,000,000 tons, wood can never be used continuously as a substitute to any large extent. However, the fact should be emphasized that when manufacturing plants are confronted with the possible necessity of substituting wood for coal, they naturally begin to consider energetically ways and means of more efficient and conservative uses of coal all along the line, so that the

broad results of this necessity may, in the end, be very beneficial.

In an attempt to determine the possible extent to which wood, in case of emergency like the present, may be substituted for coal in Massachusetts, we must take into consideration the annual growth in volume of Massachusetts forests. As we have no reliable statistics on this subject, we can only get at an approximation on the basis of our forest area, and even the total forest area of the State can only be gotten at by approximation. The total land area of the State of Massachusetts covers 5,179,520 acres. To allow 50 per cent of this total as our forest area would be conservative. That would give us in round numbers 2,500,000 acres of forest land. If we reduce this acreage by 50 per cent to allow for unstocked open areas and areas grown up with pine and other coniferous species which could not be used to advantage for fuel purposes, and for areas containing timber larger than we would be justified in using for fuel purposes, it would still leave 1,250,000 acres of our forest area as woodland which would yield at this time principally cord wood. Again, allowing an average volume growth on this acreage of a cord per acre per year would give us 1,250,000 cords, a conservative estimate of what we could cut annually from Massachusetts forests without diminishing the so-called forest principle. In other words, if our estimate for last winter's cut of cord wood in Massachusetts of 500,000 cords is approximately correct, we could, in case of necessity, cut two and one-half times that much without seriously eating into our forest principle. If we should substitute 1,250,000 cords of wood annually in place of bituminous coal for manufacturing purposes, it would result in an annual saving of 833,333 tons of coal, or approximately 4 per cent of the total annual consumption of bituminous coal in Massachusetts.

WOOD TO THE RESCUE

This is the boiler room of the Grafton-Knight Manufacturing Company. Notice the automatic stokers for feeding coal, but had it not been for their use of wood as fuel, this plant would have been compelled to shut down on account of coal exhaustion.

If such an annual cut could be made in accordance with forestry principles, it would actually result in a great improvement of the forests, as it would mean the cleaning out of inferior species, and over-mature and decrepit trees. But as a matter of fact, it is certain that under the prevailing conditions this wood will not be cut in accordance with forestry principles, except in a very few cases where the owner will be more interested in building up the condition of his land than in taking advantage of the exceptional opportunities to market wood for profit. The greatest part of the actual cutting is sure to be clear cutting, as the wood can be obtained at a lower cost by such a method. However, this method of clear cutting will not result in as serious impairment to Massachusetts forests as it might seem at first thought. The wood cut for fuel purposes is almost entirely hard woods of deciduous species. These all sprout vigorously from the stump, and accordingly, the greatest possible volume of growth per unit of area is obtained by this method of clear cutting. Accordingly, the amount of damage done to our forests will be entirely in proportion to the extent of the later burning over of such clear cut areas.

It can only be hoped that the present fuel emergency and the resulting necessity of drawing extensively on our native forest for fuel wood will lead to a better system of forest management all along the line. Although some progress has been made in recent years towards a more scientific treatment of our forest area, yet it is a notorious fact that the forest fire, the most serious menace to our forests, still remains uncontrolled and practically no extensive cutting is done with any regard for future growth on the land cut over.

The amount of wood which will be used as a substitute for coal during next winter will, of course, depend entirely upon the coal situation. If, as is apparent now, the pressure of orders under which our manufacturing plants are now working continues, and if, as is apparent

now, the coal shortage is somewhat worse next winter than the winter past, then a very much larger consumption of wood for fuel may be anticipated, and if the price at which wood may sell is left uncontrolled, it is only reasonable to believe that the price will rise sufficiently to bring the wood to market in considerable quantities no matter what the labor situation may be. During the past winter manufacturing plants as well as domestic consumers have learned of the possibilities of the substitution of wood for coal, and naturally with an increasing coal shortage, this substitution will be made to an increasing extent.

THE SMOKESTACK

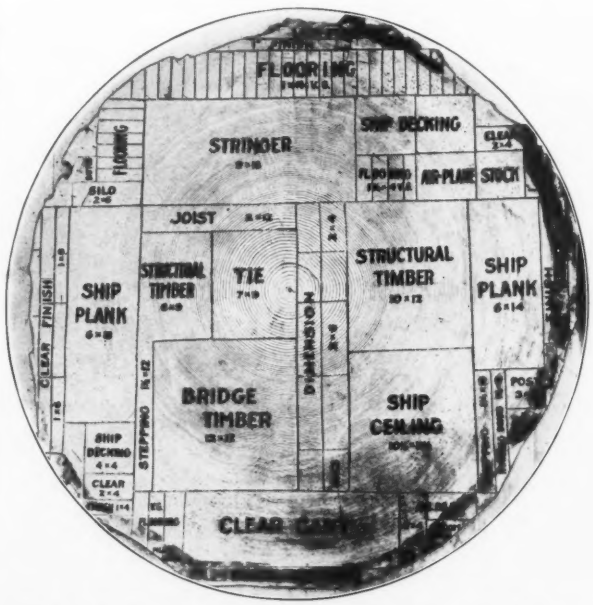
BY GUY ELLIOTT MITCHELL

ONE of the most commanding and picturesque natural sentinels in the western part of the United States is "The Smokestack" rock in Banner County, Nebraska. This singular formation surmounts a great rocky buttress which rises several hundred feet and overlooks a valley of large dimensions. Sharply silhouetted against the sky "The Smokestack" is clearly visible for scores of miles. A knowledge of its composition, however, impresses the observer more than anything else with the wonderful changes which have been wrought by Nature in this western country.

From the photograph it will be noted that the Smokestack itself is a different kind of rock from the larger mass upon which it rests. The "Stack" is what is known as "Arikares conglomerate," according to N. H. Darton, of the United States Geological Survey, a composition of clay and pebbles now tightly cemented together, but which in long ages past was a river bed. It is one of the remaining fragments of an old river channel—an earlier "Loup Fork"—when that river had a far different course from the Loup Fork of today. When one conceives the entire valley which now spreads away below the "Smokestack" to be filled up and a great river flowing over and *above* the "Smokestack" it is seen what an immense amount of material has been eroded away in this portion of the United States.

THE RESULT OF AGES OF EROSION

Now stands the "Smokestack," a majestic sentinel overlooking the valley of which it was once an integral part—a tribute to its strength of character in resisting geologic change.



WHAT TIMBER A LOG SHOULD YIELD IS SHOWN BY DIAGRAM

THE accompanying cut shows the possibilities of a perfect fir log. The one pictured here is 250 years old. It was laid out by J. W. Fowler, superintendent of the Eastern & Western Lumber Company, and was cut by a dragsaw while under water, a method necessary to keep it from splitting. The section of the log as marked here was taken to Chicago by Chester J. Hogue, assistant secretary of the West Coast Lumbermen's Association for Oregon, and shown at the annual convention of the National Railroad Appliance Association.—*Courtesy of the Portland "Evening Telegram."*

THE *EMPIRE FORESTER,* a student publication of the New York State College of Forestry at Syracuse, places the number of men who are in the Service from this young institution at 229. This includes six faculty members, 36 Ranger School boys, 46 graduates, and 141 under-graduates. In this number there are 36 officers. Eighty-seven per cent of the class of 1918 is in the Service. Recently four men have been taken from the Senior Class for inspection work on airplane lumber and one faculty member has gone into the same line of work.

THE DEL MONTE FOREST

BY LIEUT. D. T. MASON

TENTH UNITED STATES ENGINEERS (FOREST)

THE Division of Forestry at the University of California has given considerable attention to the famous Del Monte Forest on the Monterey peninsula, about 125 miles south of San Francisco. Duncan Dunning, one of the recent graduates, spent several months on the forest in the spring making a working plan for the forest as research work for a graduate degree. In the summer the senior students spent some time in this forest doing field work in silviculture and management, and incidentally checking the working plan. Foresters find many things of interest in the Del Monte Forest, especially because it is one of the few forests in the United States where there is opportunity for management as intensive as that on most French or German forests.

The Monterey peninsula, on which the forest is located, has been aptly termed the "Cradle of Pacific Coast History." The Spanish explorer Cabrillo discovered its pine-clad hills in 1542. Vizcaino, another Spanish explorer, landed at the same point and took possession in the name of King Philip, naming the place "Monterey." In 1770 Padre Junipero Serra, president and founder of the California missions, founded a mission at Monterey and a year later founded another mission at Carmel on the opposite side of the peninsula. At the same time Monterey was made the Spanish Capitol of California. Many historic buildings are found in Monterey. Thus the Del Monte Forest was the earliest in western United States to begin to yield its products regularly to the white man.

A STAND OF MONTEREY PINE TWENTY-FOUR YEARS OLD

This species has wonderful ability to "come back" on cut-over areas, as it grows with great rapidity, though it is short-lived, usually reaching full maturity at the age of fifty years.

The Del Monte Forest of about 5,600 acres includes principally Monterey pine in even-aged stands of various ages. In addition there is about one hundred acres of Monterey cypress and four acres of Gowan cypress. There are also five hundred fifty acres of grassy openings suitable for grazing, about one hundred sixty acres of scrubby beach protection forest close to the ocean, and four hundred acres of sand dunes. Most of the area consists of gentle slopes with a deep sand soil; in the central part of the forest there is a hill about eight hundred feet high with steeper slopes and shallower soils.

Although only eighteen inches of rain falls during the year, the large amount of fog and the mild climate the year round, averaging about fifty-six degrees with the average for the warmest month less than twelve degrees above the average for the coldest month, are very favorable to rapid tree growth. Until about ten years ago cutting had been going on for generations without regard for the welfare of the forest. The market demands, fortunately, had not been sufficient to damage the forest by over cutting. The splendid ability of the Monterey pine to reproduce quickly restored the cut-over areas to forest. This species, which grows with great rapidity both as individual trees and in volume per acre, is short-lived, reaching full development at the age of fifty years. In the forest the age classes are fairly well represented although there is a slight deficit in the middle age class.

Considerable damage occurred from insects about twelve years ago but a vigorous campaign practically eliminated the trouble. There is considerable damage from mistletoe and peridermium. Wind-fall ordinarily brings down about five hundred cords of wood each year. Last winter, however, the damage from this source in one severe storm amounted to about three thousand cords. (One owner of a small tract in this forest, not satisfied with natures rate of growing Monterey pine trees, "cultivated" his trees by exploding a few sticks of dynamite in the ground near the roots of

GOING THROUGH THE MONTEREY CYPRESS FOREST
This splendid road, seventeen miles long, running through a region of great natural beauty, is an easily understood attraction to the thousands of tourists visiting the region annually.

A TYPICAL VIEW FROM THE SEVENTEEN-MILE DRIVE
This beautiful stretch of perfect roadway is a revelation to the tourist meeting it for the first time.

THE MONTEREY CYPRESS FOREST
Closely skirting the rocky shore of the peninsula for about two miles, this forest is of great scenic beauty. This species is native only here and on Point Lobos, about six miles further south.

each tree; his damage from windfall in the recent storm was exceptionally heavy.) Thanks to the splendid road system and to the care that is being taken of the forest, the windfall material was promptly utilized as cordwood. Throughout the forest the ground is unusually free from debris, due to close utilization for many years and to the prompt disposal of the brush. Thus the fire danger is greatly reduced.

The forest is rendered accessible by about forty miles of splendid automobile roads. The population of about 15,000 in the towns in the vicinity brings a strong demand for wood. It has been determined that the average rate of growth in the timber producing portion of the forest is now about one cord per acre; it is estimated that this rate can be increased about fifty per cent under more intensive management. On the best soils the growth is over two cords per acre per year.

The Monterey cypress forest, about two hundred yards wide and closely skirting the rocky shore of the peninsula for about two miles, is of great scenic beauty; here cutting removes only dead trees. This species is native only here and on Point Lobos about six miles further south. The Monterey pine also occurs in forests only in this immediate vicinity. The Gowan cypress, previously mentioned, is a botanical curiosity which occurs only in two small patches of about two acres each in the Del Monte Forest, and in a few other small patches along the California coast.

An especially interesting feature of forest management in the future will be the development of a co-operative plan of management between the Pacific Improvement Company, which owns the forest, and the persons who from time to time buy tracts of land of various sizes for ocean shore country places. The great beauty of the Monterey

peninsula is due quite largely to the forest, so to preserve this great asset the forest must be very carefully managed. The Company will probably employ a technically trained forester in the near future to increase the intensiveness of management. When this is done the Del Monte Forest will be one of the most intensively managed forests in this country, and with its many activities will be especially interesting to foresters, comparing not unfavorably to intensively managed European forests.

In addition to the timber resources of the forest, which are yielding a good revenue at the rate of about $2.50

A VISTA TO THE SEA

This is a fire lane, cut through the forest of Monterey Pine to the ocean. Much care is given to fire protection through proper methods of crop production, close utilization, and prompt disposal of brush.

per cord stumpage, the toll from the famous Seventeen Mile Drive, which has now been extended to over forty miles of fine roads, the return from the sale of many thousand tons of sand annually from the sand dunes, from the grazing, and from the rental of drill grounds to the United States Army brings in a considerable income per acre.

The region is one of great natural beauty which justly attracts thousands of tourists and regular visitors annually; it easily is the one of the greatest natural attractions of any portion of the coast of the United States. In addition to the historic places, the mild climate, the

THE APPROACH OF THE SAND ENEMY

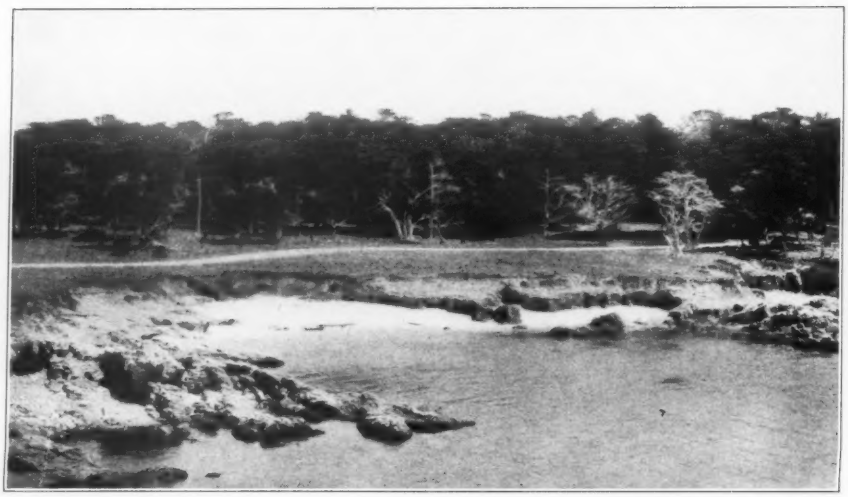
Here are seen huge sand dunes, slowly but surely encroaching upon the forest at Asilomar.

splendid road system, the beautiful forest already mentioned, the rocky coast broken here and there by fine sand beaches, the fascinating sand dunes with their characteristic flora, the exceedingly fine marine gardens visited in glass bottom boats on both the Monterey Bay and Carmel Bay sides of the peninsula, bird rocks, the seal rocks, the abalone fisheries, etc., are most interesting. The Del Monte Hotel, with its fine grounds and golf links, is the mecca of honeymooners of the Pacific coast. At Pebble Beach on the shores of Carmel Bay, is growing up a colony of well known peo-

A PECULIAR EXAMPLE OF PROTECTION

This big Monterey Pine is holding the sand dune on the leeward side, and at the same time basking and thriving in the protection thus afforded by its prisoner.

ple with their splendid seaside homes, which is coming to be the Newport of the West. The village of Carmel adjoining the Del Monte Forest is famous for its artist colony the world over. It was just a few years ago that the Pacific Improvement Company gave the Young Women's Christian Association a splendid camp site amid pines and sand dunes on the ocean shore. The illustration on the preceding page shows a huge sand dune encroaching upon the forest in this section. The camp, which was called Asilomar, has been developed into a delightful spot and its beautiful location and accessibility have attracted to it hundreds of girls annually to enjoy their vacation.



ANOTHER SECTION OF THE CYPRESS FOREST

Running along the ocean front, the beauty of this forest, the rocky coast broken here and there by fine sand beaches, the mild climate and the splendid road system form an irresistible combination of attractions for the tourist.

FIRE PROTECTION IN ONTARIO

BY CLYDE LEAVITT

GREAT strides toward effective forest fire protection were made in Ontario last year, under the Provincial Forestry Branch, notwithstanding that the transfer of authority over this work was not made until a relatively late date. A total of about 1,100 men were engaged in this important work, including fire rangers, inspectors and head office supervision. The organization is to be further extended during the coming season, and the supervision will be tightened up to a material extent. As with any new organization, increasingly efficient results may be expected from year to year, as the men become better trained and as those less competent are weeded out.

A total of 1,110 fires were reported, of which 68 per cent occurred before July 1. Of the fires attributable to railways, 60 per cent occurred along the National Transcontinental. Settlers clearing land were charged with 91 fires, and neglected camp fires with 154.

The total area burned over was 384,164 acres of which 19 per cent was timber land, 39 per cent cut-over land, 20 per cent young forest growth, and 21 per cent barren. The total amount of timber damaged was estimated at about 15 million feet, in addition to 91,246 cords, mostly pulpwood, and 781,685 ties.

Material progress has been made in the construction of permanent improvements, such as lookout towers, trials, telephones, portage, etc.

A beginning has also been made in securing the disposal of logging slash where this constitutes a danger to life and personal property, as is frequently the case in the clay belt.

Some 3,500 permits were issued for the burning of settlers clearing slashes. This means a very great reduction in the danger of fire escaping and causing damage, to say nothing of loss of life.

Ontario has now definitely taken its place alongside the other governmental agencies throughout Canada, which are adopting up-to-date methods of organization and policy for the reduction of the enormous forest fire losses which have caused such disastrous losses in the past.

COLONEL GRAVES HONORED

COL. Henry S. Graves, Forester of the United States Forest Service, has been elected Honorary member of the Royal Scottish Arboricultural Society of Edinburgh, Scotland, in recognition of his eminent services to forestry. The Royal Scottish Arboricultural Society was founded in 1854 and shares with the Royal English Arboricultural Society the leadership in forestry matters not only in Great Britain but to a large extent throughout the British Empire. Its list of 1,500 active members includes the names of a large number of professional foresters in the British Colonies and possessions, all over the world, but the Society has less than thirty honorary members, of whom about half are distinguished foreign scientists and administrators, mainly European.

The Society, in addition to the publication of its Transactions and the consideration of papers at its regular meetings, makes an annual excursion for field study. It also offers annual prizes and medals for essays on practical subjects and for inventions connected with appliances used in forestry. Such awards have been granted continuously since 1855.

The distinction of Honorary Member is shared by Colonel Graves with only one other citizen of this country, Dr. Sargent, who was elected an Honorary Member in 1889.

AMERICAN FORESTERS IN MILITARY SERVICE

This list is compiled from various sources. Every effort has been made to make it complete and accurate, but in the nature of things there are necessarily omissions and errors. This list, which has heretofore been printed in every issue of AMERICAN FORESTRY, will be printed quarterly, or in every third issue of the magazine, and all foresters and others who can supply additional names, report casualties, or note corrections are urged to communicate with American Forestry as promptly as possible, to the end that the list may have full value as a record of the men who have gone to war

AGEE, Fred B., 1st Lt., Engr. Corps (For.); U. S. R., A. E. F., P. O. 702, via N. Y., deputy forest supervisor, U. S. F. S.
Adams, George (Ohio State Univ.), 10th Eng. (For.).
Adolph, Raymond D. (N. Y. State Col. For., '15), 19th Cavalry, Ft. Ethan Allen, Vt.
Albano, Jack, forest ranger, U. S. F. S.
Alden, Phil. E. (Mich. Ag. Col., '18). 10th Eng. (For.) A. E. F.
Aldous, Tura M., grazing, U. S. F. S.
Aldsworth, Donald (Univ. of Minn., '14), Off. Tr. Camp, Presidio, Cal., San Diego, Cal.
Alexander, Ben. (Bilt. For. School), 2nd R. O. T. C.
Alexander, J. B., 1st Lt. Aviation Corps (Univ. of Wash., '17).
Allen, E. Whitman (N. Y. State Col. For., '19), 104th Bat., Camp Wadsworth, Spartanburg, S. C.
Allen, Raymond, New Jersey.
Allmendinger, E. J., 1st Lt. (Univ. Mich., '16), National Army, Camp Taylor, Ky.
Almy, L. K. (N. Y. State Col. For., '16), 11th Eng. (Railway), France.
Amen, Albert, 6th Bn., 20th Eng. (For.), fire guard, U. S. F. S.
Ames, F. E. (Yale For. School, '06), Capt., Co. B, 7th Bn., 20th Eng. (For.). U. S. F. S.
Anderson, A. C., 2nd Lt. U. S. A., Ft. Leavenworth, Kan. (Univ. of Wash., '17).
Anderson, Albert T. (Ore. Ag. Sch. For.), 2nd Lt., National Army.
Anderson, Emil A., deputy forest supervisor, U. S. F. S.
Anderson, Parker O. (Univ. of Minnesota, '16), 10th U. S. Eng., France, U. S. F. S.
Anderson, S. D. (Univ. of Mich., '17), Sec. 590, U. S. A., A. S. Allentown, Pa.
Andrews, A. K. (Ore. Ag. Sch. For.), Sgt., 116th Eng.
Andrews, J. C. (Univ. of Mich., '18), Co. E, 10th Bn., 20th Eng. (For.), American University Camp, Washington, D. C.
Aney, John L. (N. Y. State Ranger Sch., '13), Second Officers Training Camp.
Archer, Frank L., Engr. Headquarters, France, forest clerk, U. S. F. S.
Archibald, H. (Ore. Ag. Sch. For.), Sgt., 116th Eng.
Armstrong, Carroll W. (Bilt. For. School), Quartermaster's Dept., Fort Dodge.
Armstrong, L. J., Lt. (Univ. Mich., '13), Rainbow Division, A. E. F.
Armstrong, Ralph H. (Bilt. For. School), 104th Inf., Expeditionary Forces, France.
Arnold, Alan F., Sgt., Camp Dix, N. J.
Atkinson, E. S. (Yale For. School '16, and Biltmore), 2d Lt., Ft. Grant, Canal Zone.
Atwood, C. R. (Univ. of Maine, '15), manager, Unit 1, New England Sawmill Units.
Aylward, F. N. (Univ. of Calif.), Amb. Corps.

BACKUS, Romayne L. (Univ. of Minn., '18), 20th U. S. Eng., U. S. F. S.
Badertscher, Ed., temp. clerk, U. S. F. S.
Bacon, J. M. (Univ. Mich., '18), Co. B, 5th Bn., 20th Eng. (For.), France.
Badke, Frank C. (N. Y. State Col. For., '19), Navy.
Baker, Hugh P. (Yale For. School, '04), Capt. 46th U. S. Inf., Camp Gordon, Ga., Dean N. Y. State Col. of Forestry.
Baldenburg, Max B., clerk, U. S. F. S.
Balderee, E. W. (Ore. Ag. Sch. For.), Corp., 116th Eng., A. E. F.
Baldwin, Donald A. (N. Y. State Col. For., '17), N. A., Camp Devons, Ayer, Mass.
Baldwin, H. C. (Penn. State, '14).
Ballew, William Murray (Yale, '15), 5th Bn., 20th Eng. (For.), A. E. F.
Balmer, Joseph D. (Uni. of Wash., '18), Sgt. Bat. D, 346th Fld. Art., American Lake Encampment.
Ballard, Dean (Uni. of Wash., '12), American Lake Encampment.
Ballou, F. C. (Penn. State, '16), 20th Eng. (For.), 3rd Bn., Co. C.
Bannister, Fred., 20th Eng. (For.), fire guard, U. S. F. S.
Bar, Warren, 20th Eng. (For.), fire guard, U. S. F. S.
Barbur, Hal (Ore. Ag. Sch. For.), 1st Lt.
Barker, S. Omar, Co. D., 502nd Service Bn., Camp Merritt, N. J., U. S. F. S.
Barlow, Harold (Yale For. School, '14), 1st Lt., Ordnance, Coe Brass Bldg., Ansonia, Conn.
Barnett, William L. E. (Yale, '15), Section Sanitaire, U 70, Convois Automobiles, par B. C. M., Paris, France.
Barr, John B., forest ranger, U. S. F. S.
Bartlett, E. F. (Univ. Mich., '16), N. A.
Barton, Robert M., 20th Eng. (Forest), Amer. Univ., Wash., D. C.; forest ranger, U. S. F. S.
Bassett, Richard (N. Y. State Col. For., '16), Spec. Demolition Detail, Ft. Niagara, N. Y.

THE ROLL OF HONOR

IN THIS ROLL OF HONOR WE WILL PUBLISH EACH MONTH AS THEY ARE RECEIVED OR REPORTED TO US, THE NAMES OF FORESTERS WHO MEET DEATH IN SERVICE.

AUGSPURGER, STANLEY R., Dayton, Ohio. (Univ. of Mich. '17). Field assistant, U. S. F. S., District 6. Enlisted Dec. 7, 1917; was assigned to Co. D, 6th Battalion, 20th Engineers (Forest), and was lost February 2, 1918, from the transport *Tuscania*. His body was recovered, identified and buried on the Scotch coast.

MUNCASTER, ROY (Univ. of Wash., '17), Ranger, U. S. F. S., Olympic National Forest. Enlisted in December, 1917; was assigned to the 20th Engineers (Forest), and was lost from the *Tuscania*. He is reported by the War Department as among the missing or the unidentified dead.

REES, H. S. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

REES, L. A. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

SHARP, MILTON K. (Univ. of Ohio, '16), Bat. A, 134th Field Art., killed December 5, 1917, Montgomery, Ala.

SIMPSON, C. E. (Penn. State Col., '16), 10th Eng. (For.), died in Scotland October 3, 1917.

SMITH, A. OAKLEY (Yale For. School, '14), killed while training for aviation, drowning in Delaware River by fall July 21, 1917.

YOUNG, DOUGLAS E., private English Army, killed in France April 10, 1917, was State Forest Warden, Maryland.

Bastian, Clyde E., Corp. 20th Eng. (For.), Univ. of Mich., '16). A. E. F.
Bates, Raymond B. (N. Y. State Col. For., '20), 104th F. A. Camp Wadsworth, Spartanburg, S. C.
Batten, R. W. (Yale For. School, '16), 10th Eng. (For.), A. E. F.
Bay, Helmuth (Mont. For. School), 20th Engineers.
Beal, Cecil R. (Univ. of Wash., '17), 2nd Lt. 20th Eng. (For.), American Univ., Washington, D. C.
Beals, James B, 20th Eng. (For.), forest ranger, U. S. F. S.
Beam, Donald (Iowa State Col. ex, '20), C. A. C., 1st Co., Ft. De Bussey, Honolulu, Hawaii.
Beaman, Clarence W., messenger, U. S. F. S.
Beaman, La Vaughn, Co. A, 5th Bn., 20th Eng. (For.), U. S. F. S.
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Bell, George R. (Yale For. School, '18), 2nd Lt., 12th Fld. Art., A. E. F.
Bell, H. Waite (N. Y. State Col. For., '19), 10th Eng., A. E. F.
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Beltz, H. C., 1st Lt. (Mich. Ag. Col., '18)
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Carney, Thomas (Mont. For. School), 20th Engineers.
Carpenter, Herbert M. (Bilt. For. School), 20th Eng. (Forest).
Carvey, Matthew (Ohio State Univ.), Aviation
Carey, N. Leroy (Univ. of Mich., '16), 405 Squad. A. S. S. C., North Cantonment, Vancouver, Wash. Forest assist., U. S. F. S.
Casey, James W. (N. Y. State Col. For., '17), 10th Eng. (For.), A. E. F.
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Chamberlain, Harry (Penn. State, '14), 20th Eng (Forest).
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Chandler, Chas. O. (N. Y. State Col. For. ex, '18), 10th Eng., A. E. F.
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Cheetham, J. W., Corp. (Mich. Ag. Col., '19).
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Chubb, S. W. (Penn. State, '12), U. S. F. S.
Chudderdon, Harold A., forest ranger, U. S. F. S.
Clancy, J. P. (Ore. Ag. Sch. For.), 20th Eng. (For.).
Clark, Charles R. (Yale, '10), recommended for commission in 20th Eng., but no further action taken.
Clark, Donald H. (Univ. of Wash., '17), 1st Lt., Bat. F, 348th Field Art., American Lake Encampment.
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Clementsen, Harold, 2nd Lt. (Mich. Ag. Col., '17).
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Cope, H. H. (Penn. State, '15), 10th Eng. (Forest).
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Ingebrightsen, R. (Mont. For. School, ex '19), Av. Corps.
Irish, C. F. (Ohio State Univ.), Camp Sheridan, Ala., with the 112th Sanitary Train doing mosquito control work.
Irwin, Albert B. (N. Y. State Col. For., '17), N. A., Camp Dix, N. J.
Irwin, James A. (Mt. Alto, '12), Sgt., Co. C, 1st Bn., 10th Eng. (For.), France, Pa. Dept. For
Isaac, Leo (Minn. For. Sch.).
Isenecker, Elmer S. (N. Y. State Col. For., '18), Inspector's Sch. Signal Corps, Dayton, Ohio.
Isola, Vico C. (Yale For. School, '14)
Ivory, Edward P. (N. Y. State Col. For., '16), 335th F. A., U. S. N. A., Camp Pike, Ark.

JANOUCH, Karl L. (Univ. of Nebr., '17), Corp., Co. B, 1st Bn. 20th Eng. (For.), Am. Exped. Forces.
Jeffrey, Walter (Cornell, '18), Ensign in the Navy, Battleship "Missouri."
Jeffrey, W. M., Lt., Co. 6, E. R. O. T. C., Camp Lee, Petersburg, Va.
Jensen, Irving R., 20th Eng. (For.), forest ranger, U. S. F. S.
Jenson, A. F., U. S. F. S
John, H. C. (Penn. State College, '14).
Johns, H. C. (Penn. State, '16), 20th Eng. (Forest).
Johns, Walter Ridgley, 158 Co., 35 Bat., 166th Depot Brigade, Camp Lewis, Am. Lake, Wash., U. S. F. S.
Johnson, Ansel R. H. (Biltmore), Naval Aviation section.
Johnson, C. H. (Mich. Ag. Col., '16).
Johnson, Eric A. (N. Y. State Col. For., '18), Amb. Corps, No. 30, A. E. F.
Johnson, F. W. (student, Ohio State), 10th Engineers (Forest).
Johnson, Joseph H. asst. forest ranger, U. S. F. S.
Johnson, Oscar S. (Univ. of Minn., '16), Sgt., 10th Eng. (For.), U. S. F. S.
Johnson, Owen (Ore. Ag. Sch. For.), 20th Eng.
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Johnson, R. J. (Mich. Ag. Col., '16).
Johnson, Sidney L. (Univ. of Wash., '18), Co. 67, 166th Depot Brigade, American Lake Encampment.
Johnson, W. E. (N. Y. State Ranger Sch., '16), Battleship Kansas.
Johnson, W. R. (Mich. Ag. Col., '12).
Johnston, C. E. (Ore. Ag. Sch. For.), Corp., Co. D, 20th Eng.
Johnston, C. M. (Ore. Ag. Sch. For.), 20th Eng.
Jones, Alvin (Mont. For. School, ex '19), Coast Artillery.
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Jones, Luther G. (Yale, '16, short course), Co. B, 10th Eng. (For.), A. E. F.
Jotter, W. E. (Univ. Mich., '10), 20th Eng. (For.), Co. A, 3rd Bn., A. E. F.
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KAESTNER, H. J., 20th Eng. (For.), Forester of W. Va., forest examiner, U. S. F. S.
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Kaish, Stephens S. (N. Y. State Col. For., '18), 52nd Eng. (Railway), Camp Upton, L. I.
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Kearney, Daniel P., 1st Lt. (N. Y. State Col. For., '18), Bn. Supply Officer, 153d Depot Brig., Camp Dix, N. J.
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Kelley, Gordon L. (Macalaster College, Minn.), 10th Eng. (For.), A. E. F., France.
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Kelly, Evan W., Capt. 10th Eng. (For.), forest examiner, U. S. F. S.
Kelly, F. A. (Univ. Mich.), 10th Eng. (For.), A. E. F.
Kemp, P. A., Co. A., 29th Eng., A. E. F., U. S. F. S.
Kennedy, Robert S. (N. Y. State Col. For., '19), Co. E, 10th Bn., 20th Eng. (For.), Washington, D. C.
Kenny, John, woodsman, Ten Saw Mill Units, Mass. For. Dept.
Kendall, Floyd, Sec. 2, Marine Barracks, Mare Island, Vallejo, Calif., fire guard, U. S. F. S.
Kent, Hugh, Ordnance Dept., Training School, Draftsman, U. S. F. S.
Kephard, G. S. (Cornell, '17), 10th Eng. Forest), France.
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Kessler, N. T. (Penn. State, '21), Navy Hospital.
Ketcham, Louis, forest ranger, U. S. F. S.
Ketridge, John C., forest examiner, U. S. F. S.
Keyes, John H., Co. A, 20th Eng. (For.), A. E. F. (Yale, '12).
Kiefer, Francis, Capt. E. O. R. C., asst. dist. forester, U. S. F. S.
Kilbourne. E. I. (Cornell, '17).
Kilham, Harold L. (N. Y. S. Col. For., '16), 302 Aero Sup. Squad., Vancouver Bar., Wash.
Kilmer, William F. (Biltmore), Co. B, Signal Corps, Camp Sheridan, Ala.
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Kimmel, C. C., 20th Eng. (For.), A. E. F., U. S. F. S.
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King, Robert F., 2nd Lt. Coast Artillery (Univ. of Wash., '19).
Kingsley, Carroll E. (N. Y. State Col. For., '19), Naval Res.
Kingsley, Ray (Mont. For. School), Co. K, 163rd Inf., A. E. F.
Kinney, Albert S. (N. Y. State Col. For., '20), Ft. Trumbull, New London, Conn.
Kiser, Max (Ohio State Univ., '15), 330th Inf., Camp Sherman, Ohio.
Kishbaugh, W. (Penn. State, '17), 20th Eng. (For.).
Kissam, Charles H., (Biltmore, '08), 25th Eng., N. A., A. E. F., Nat. For. Examiner, Albuquerque, N. Mex.
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Kittredge, Joseph, Jr., forest examiner, U. S. F. S.
Klassell, Alvin (Mich. Ag., Col.).
Klobucher, F. J. (Univ. of Wash., '14, and Yale, '16), 1st Lt., 20th Eng. (Fr.), A. E. F.
Knight, Herbert (Ohio State Univ.), O. N. G., Montgomery, Ala.
Knoch, H. G. (Univ. Mich., '13), 20th Eng. (For.), A. E. F.
Knowlton, H. N., engineer in forest products, U. S. F. S.
Knox, Donald G., Co. D, 4th Bn., 20th Eng. (For.), lookout, U. S. F. S.
Kobbe, William H. (Yale For. School, '04), Capt., 30th Eng. (For.), A. E. F.
Koch, Elers (Yale, '03).

Koechlein, John H., Co. 1, 18th Eng., A. E. F., fire guard, U. S. F. S.
Koetsier, John, Capt., Field Art., 2d Bat., O. T. C., Camp Lewis, Amer. Lake, Wash., temporary force, U. S. F. S.
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Koleman, N., Sgt. (Mich. Ag. Col., '19).
Koomey, L. H. (Yale For. School, '12), Co. C, 1st Bn., 20th Eng. (For.), A. E. F.
Korista, Drohmir (Univ. of Minn.), Coast Art.
Kraebel, Charles J., (Univ. of Mich., '12), Sgt., 10th Eng. (For.), Co. D, A. E. F., France, forest assistant, U. S. F. S.
Kraft, Edward B., 1st Bat., 20th Eng., (For.).
Kratt, F. G. (Univ. of Mo.), 10th Engr. (Fr.).
Krause, John E., Co. H, 367th Inf., Camp Lewis, Wash., U. S. F. S.
Krell, Frederick C. (Penn. State, '13), Sergt. 1st class, 10th Eng. (Forest), Asst. Forester Pennsylvania Railroad.
Krell, J. W. (Penn. State, '17), timber inspection.
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Kuemmerling, Karl (Ohio State Univ., '16), Hospital Unit.
Kunkle, A. V. (Univ. of Mont.), 10th Eng. (For.)
Kupha, Herbert H., Draftsman, Signal Corps, U. S. F. S.
Kutzleb, Chas. (Univ. Mich., '17), National Army.

LAFON, John (Biltmore), Capt. 10th Eng. (For.), Forest Branch B. C.
Lamonte, A. D. (Penn. State, '18).
Lackamp, Leo (Ohio State Univ.), Naval Reserve, U. S. S. Colpher, Municipal Pier, Chicago, Ill.
Lade, C. G. (N. Y. State Col. For., '18), Ensign, U. S. Navy (U. S. S. Magnet).
Lamb, Lester Q. (N. Y. State Col. For., '19), Aviation, France.
Lamley, H. A. (Univ. Mich.), Signal Corps, Wood Inspector.
Lange, Chas. W. (N. Y. State Col. For., '17), National Army.
Langille, H. D., Major, 20th Eng. (For.), A. E. F.
Lankenau, W. H. (Ore. Ag. Sch. For.), 20th Eng., Co. F.
Landess, W. D., 413 Squad., A. S. S. C., Vancouver Barracks, Wash., U. S. F. S.
Larzon, Arthur K. (Univ. of Wash.), Sgt., For. Reg., France.
Larrimer, W. H. (Ohio State Univ., '13), Officers' Training Camp, Chillicothe, Ohio.
Larson, Andrew H., 20th Eng. (For.), forest ranger, U. S. F. S.
Lasko, Ludwig (Univ. Mich., '17), Spruce Production Division, Vancouver Barracks.
Latane, William (Yale, '08), recommended for commission in 20th Eng.
Laubengayer, W. C. (Univ. Mich., '14), Spruce Inspector at Dayton Aviation Camp, Ohio.
Lavis, Lynn U. (N. Y. State Col. For., '16), Aviation.
Leach, Walter (Mt. Alto, '14), Co. Hdqtrs., 314th **Inf., Camp Meade, Md., Pa. Dept. For.**
Lee, Chester A. (Yale For. School, '17), Sgt., 10th Eng. (For.), A. E. F.
Lee, S. B., 2nd Lt. (Mich. Ag. Col., '17).
Leete, Bernard E. (Yale, '15), recommended for commission with Forest Regiment.
Lehr, Fred S. (Yale, '13), Marines, Paris Island, S. C.
Leight, Oliver, Eng., forest guard, U. S. F. S.
LeMonte, A. D. (Penn. State, '18), timber inspection.
Lentz, Gustav H. (Yale For. School, '17), Sgt., 10th Eng. (For.), A. E. F., Maryland
Leufgran, L. L. (N. Y. State Col. For., '20), 1st N. Y. Cav., Brooklyn, N. Y.
Leveaux, Cosmer (Mich. Ag. Col., '18).
Leve, Walter H., A. S. S. C., Vancouver Barracks, Wash., forest examiner, U. S. F. S.
Lewis, Ferry D., forest ranger, U. S. F. S.
Lewis, H. T. (Univ. Mich., '13), 20th Eng. (For.).
Lewis, Trevor, 4th Eng., Vancouver, Wash., Headquarters detachment, U. S. F. S.
Lightfoot, Frank, 3rd Bn., 20th Eng. (For.), Co. F, A. E. F., A. P. O. 712, U. S. F. S.
Lind, Fred (Univ. of Wash. Law), 1st Sgt., 45th Co., 166th Depot Brigade, Camp Lewis, American Lake, Wash., U. S. F. S.
Lindsey, Eugene L., 1st Lt. 10th Eng. (Forest), (Yale For. School, '11), forest examiner, U. S. F. S.
Little, A. W. S., 1st Lt. (N. Y. State Col. For., '16), Inf.
Littlefield, Theron R., Corp., Hdg. Co., 340th F. A., Camp Funston, Kas., forest ranger, U. S. F. S.
Livingston, R. (Penn. State, '19), 10th Eng. (For.).
Lockbridge, Earl (Mont. For. School), Coast Art.
Lockwood, Herbert C. (N. Y. State Col. For., '20), Base Hosp., Pike, Arkansas.
Lockwood, Milton K. (Biltmore), 1st Lt., School of Military Aeronautics, Austin, Tex.
Loetzer, Louis C. (Student Mt. Alto, '19), Co. A, 41st Bn., 20th Eng. (For.), Camp Amer. Univ., Washington, D. C.
Logan, Leland, 2nd Lt. (N. Y. State Col. For., '19), Aerial Obs., Fort Worth, Texas.
Lommasson, Thos., 10 Engineers (Forest), Am. Exped. Forces, France, U. S. F. S.
Long, Edward (N. H. State Col., '17), U. S. F. S.
Loof, H. W. (Ore. Ag. Sch. For.), 1st Lt., Av.
Lord, Milton (Univ. of Minn.), U. S. Marine Barracks Headquarters Detachment, 1st Rgt., Philadelphia, Pa.
Lothman, Jr., William, Corp., Hdqrs. Detachment, 7th Bn., 20th Eng. (For.), France.
Loud, William D., 20th Eng. (Forest).
Loughlin, John D., Amb. Corps (Cornell, '17).
Love, T. W. (N. Y. State Col. For., '17), 20th Eng., France (on board "*Tuscania*," saved).
Lovejoy, O. L., 1st Lt. (Univ. Mich., '16), Cal., Monterey, Calif.
Loveman, A. M. (Yale For. School, '16), Cost Inspection, Bethlehem Shipbuilding Corp., Providence, R. I.
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Loy, Elmer C. (Iowa State Col. ex, '18), Corp., Radio Co., 109th Fld. Signal Bn., Camp Cody, New Mexico.
Lumsden, H. M. (Univ. Mich., '19), Naval Res., Rifle Ranger, Mt. Pleasant, N. C.
Lundgren, Leonard, Capt., 116th Engrs., 41st Div., A. E. F., U. S. F. S.
Luther, T. F., 20th Eng. (Forest), (Cornell, '17).
Lydecker, Irving B. (N. Y. State Col. For., '20), 21st Co., Ft. Slocum, N. Y.
Lyle, Ben, 10th Eng. (For.), A. E. F., U. S. F. S.
Lyman, L. G. (Ore. Ag. Sch. For.).
Lyman, R. R. (Penn. State, '18), 10th Eng. (For.).
Lyon, A. C. (Mich. Ag. Col.).

MACKECHNIE, A. R., 2nd Lt. U. S. A. (Univ. of Wash., '18).
Malmstein, Harry E., grazing assistant, U. S. F. S.
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Macauley, Walter J. (N. Y. State Col. For., '17), 11th Eng., Co. E, France.
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MacPherson, George A. (N. Y. State Ranger Sch., '16), 20th Eng., A. E. F.
Maloy, Thomas F., 20th Eng. (Forest), Co. B., 5th Bn. U. S. F. S.
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Marckworth, Gordon D. (Yale For. School, '17, and Ohio State Univ.), Co. C, 20th Eng. (For.), Va. State For. Dept.
Marsh, A. Fletcher (Yale For. School, '11), Capt., Q. M. Sec., O. R. C., Wash., D. C.
Marshall, Eugene, 416 Squad., A. S. S. C., Camp 2, Cherry Valley Timber Co., Stillwater, Wash., U. S. F. S.
Marston, Major Roy L. (Yale, '02), 103rd U. S. Inf., Co. E, France.
Martin, Dean (Univ. of Minn., '11), Lt., 20th Eng. (For.), A. E. F.
Martin, Robert G. (Iowa State Col. ex, '19), 145th Aero Squadron, Kelley Field, So. San Antonio, Tex.
Mason, David T. (Yale For. School, '07), Capt., 10th Eng. (For.), Prof. of For., Univ. of Cal.
Mason, Elmer Brown (Yale ex, '11), 1st Lt., N. G., Co. K, 120th Inf., Camp Service, Greenville, South Carolina.
Mathew, Waldo (Univ. of Wash., '19), Co. 8, 166th Depot Brigade, American Lake Encampment.
Mathews, Hugh, 20th Eng. (For.), Co. D, 4th Bn., A. E. F.
Mattoon, Merwin A. (Yale, '14), Co. D, 10th Bn., 20th Eng. (For.), Amer. Univ., Wash., D. C.
Maudlin, Cecil V., Signal Corps, Asst. Eng. in Forest Products, U. S. F. S.
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McCaffrey, Joseph E. (N. Y. State Ranger Sch., '15), 20th Eng., A. E. F.
McCann, Arthur (N. Y. State Col. For., '18), Camp Dix, N. J.
McCarthy, C. C. (Iowa State Col. ex, '16), 10th Eng. (For.), A. E. F.
McClure, B. M. (Mich. Ag. Col., '17).
McCollum, J. E. (Ore. Ag. Sch. For.), 10th Eng. (For.).
McCullough, Thomas E. (Yale For. School, '11), E. O. T. C., Camp Lee, Va.
McCutcheon, P. (Penn. State, '20), 20th Eng. (For.).
McCutcheon, T. D. (Penn. State, '20), 20th Eng. (For.).
McDougall, Edmond H. (Univ. of Wash., '17).
McDonald, W. A., Capt. (Mich. Ag. Col., '13). 338th Inf., Camp Custer, Mich.
McDowell, Willard, U. S. F. S.
McGillicuddy, Blaine (Univ. of Wash.), forest regiment, France.
McGlaughlin, Eugene R., 20th Eng. (Forest).
McKnight, Roscoe, 1st Lt. 10th Eng. (Forest), U. S. F. S.
McManis, Francis S., 2nd Lt. (N. Y. State Col. For., '18), R. O. T. C., San Antonio, Texas.
McNulty, A. R. (Wyman Sch. Woods, '17), Co. C, 1st Michigan Engineers.
McNulty, L. Edgar (Mt. Alto For. Acad., '17), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
McPherson, Benj. D. (Mt. Alto For. Acad., '16), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
McQuarrie, Claude (Mont. For. School, ex '19), West Point.
Meaker, Robert L. (N. Y. State Col. For., '16), 20th Eng., Co. D, A. E. F.
Meengs, Herbert G., in care Navy Dept., U. S. F. S.
Meek, Chas. R. (Mt. Alto, '12), Sgt., 20th Eng. (For.), Co. D, 4th Bat., A. E. F., Pa. Dept. For.
Meloney, Henry M. (N. Y. State Col. For., ex., 18), 443rd Aero Constr, Squad, Spruce Div., in care of Western Cooperage Co., Camp C., Olney, Oregon.
Menuennall, F. D., Corp., Headquarters Detachment, 7th Reg. Engr., Ft. Laevenworth, Kan., surveyor draftsman, U. S. F. S.
Mengel, A. W. (Wyman Sch. Woods, '17), 20th Eng. (For.).
Merrill, G. P. (N. Y. State Ranger Sch., '14), Army.
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Merrill, Perry H. (N. Y. State Col. For., '17), S. S. U. 12, Par B. C. M., Convois Autos, Paris, France.
Merrill, Winn, 2nd Lt. (N. Y. State Col. For., '18), Quartermaster's Corps, Camp Meade, Md.
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Meschke, Karl G. (Mich. Ag. Col., '15), 20th Eng. (Forest), Co. E., 4th Bn., A. E. F., forest assistant, U. S. F. S.
Messer, Asa E., Army, For. Ranger, U. S. F. S.
Meyer, L. A., 10th Eng. (Forest).
Meyer, Leo. W. (Yale For. School, '17), Sgt., 1st class, 10th Eng. (For.), A. E. F.
Meyers, Frank (N. Y. State Col. For., '13), Camp Lewis, American Lake, Wash.
Meyers, O. W. (Penn. State, '15), 10th Eng. (For.).
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Middour, Joseph C. (Mt. Alto, '16), Co. C, 1st Bn., 10th Eng. (For.), A. E. F., Pa. Dept. For.
Miles, Clark, Lt., Co. C, 146 M. G. Bn., 41st Div., Camp Merritt, N. J., forest examiner, U. S. F. S.
Miles, George F., Capt., Adjutant 8th Bn., France.
Millar, W. N., Capt. (Yale For. School, '08), Univ. of Tor., Toronto, Can.; 10th Eng. (For.), A. E. F.
Miller, Edwin B. (Mt. Alto, '17), Co. C, 1st Bn., 10th Eng. (For.), France, Pa. Dept. For.
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Miller, Otto F., Co. D, 20th Eng. (For.), A. E. F.
Miller, J. M. (Penn. State, '13), 10th Eng. (For.)
Miller, W. M. (Mich. Ag. Col., '19).
Minshall, Fred S. (Ohio State Univ.), 10th Eng. (For.).
Minner, Clifford R., forest ranger, U. S. F. S.
Mitchell, E. T. (Penn. State Col. For. Dept.), U. S. F. S.
Mitchell, H. W., 1st Lt. (Univ. Mich., '13), Inf., Camp Grant, Rockford, Ill.
Modisette, W. M. (Biltmore), Capt. 8th U. S. Cavalry
Moir, John (Minn. For. Sch., '13), Co. L, 351st Inf., Camp Dodge, Iowa.
Mongrane, Joe, woodsman, Ten Saw Mill Units (Mass. For. Dept.).
Montgomery, Ray C., Capt., Camp Funston, Ft. Riley, Kan., forest ranger, U. S. F. S.
Montgomery, W. Erdmann (Mt. Alto, '13), 2nd Lt., 335th Regular F. A., Camp Pike, Ark., Pa. Dept. For.
Moore, Barrington, Capt. (Yale For. School, '08), U. S. F. S., France.
Moore, M. M. (Oregon Ag. College), Troop A, 1st Cav., Camp Harrey J. Jones, Douglas, Ariz., U. S. F. S.
Moore, Louis R. (Biltmore), Canadian Eng. (For.), in England.
Moore, Walter M. (Univ. of Minn., '09), Lt., Signal Corps, in charge inspection of aeroplane stock, Vancouver Bks., Wash.
Moran, Lewis E. (N. Y. State Col. For., '18), Co. C, 7th U. S. Inf., Camp Greene, Charlotte, N. C.
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Morris, R. D. (Iowa State Col. ex, '16), 10th Eng. (For.), Co. B, A. E. F.
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Morrison, J. W. (Penn. State, '20), Amb. Corps.
Morrison, Tom, Co. A, 10th Engineers (Forest), Am. Exped. Forces, France, U. S. F. S.
Morrison, W. N. (Penn. State, '20), Amb. Corps.
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Mosch, Walter (student at Mt. Alto), Co. E, 4th Bn., 20th Eng. (For.), A. E. F., Pa. Dept. For.
Moulthen, Fred (Mont. For. School), U. S. Marines.
Moyer, Marvin H. (Mt. Alto, '16), Co. B, 5th Bn., 20th Eng. (For.), A. E. F., Pa. Dept. For.
Mozeen, Herbert D. (N. Y. State Col. For., '16), No. A. Camp Dix, N. J.
Mullen, Frank E. (Iowa State Col. ex, '20), Co. B, 10th Eng (For.), A. E. F.
Munro, Willis (Yale, '12), Plattsburg, N. Y.
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Murphy, E. C., 2nd Lt., U. S. A. (Univ. of Wash., '20).
Murphy, R. A. (Yale For. School, '18), Coast Patrol, stationed at Gibraltar.
Musser, Ralph W. (Mt. Alto, '17), Co. B, 305th Fld. Art., Camp Lee, Petersburg, Va., Pa. Dept. For.

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Myers, Edgar (Cornell, '17), 10th Engineers (For.).
Myers, Frank B., 6th Training Camp, Co. E, 316th Engrs., Camp Lewis, American Lake, Wash., forest assistant, U. S. F. S.
Myers, Leon F. (N. Y. State Col. For., '20), 2nd Training Brigade, San Antonio, Texas.
Myers, Reynolds V. (Biltmore), senior non. com., 10th Eng. (Forest).

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MONTHLY LIST FOR MAY, 1918

(Books and periodicals indexed in the library of the United States Forest Service.)

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Ucker, Clement S., and Mitchell, J. A., Forestry: its place in the economic life of the south. Two addresses made at the 8th annual meeting of the N. C. Forestry association. 24 p. Chapel Hill, N. C., 1918.

Proceedings and reports of associations, forest officers, etc.

Canada—Dept. of the Interior—Forestry branch. Report of the Director of forestry for the year 1917. 81 p. il. Ottawa, 1918.

Indiana—Baluchistan—Forest dept. Progress report of forest administration for 1916-17. 30 p. Calcutta, 1918.

India—Madras presidency—Forest dept. Administration report for the twelve months ending 30th June, 1917. 146 p. Madras, 1918.

Maryland—State board of forestry. Report for 1916 and 1917. 86 p. pl. Baltimore, Md., 1918.

Massachusetts forestry association. Report of the national parks and national forest tour. 26 p. il. Boston, Mass., 1917.

Michigan agricultural college—Forestry club. The M. A. C. forester, vol. 3. 35 p. il. East Lansing, Mich., 1918.

New South Wales—Dept. of forestry. Report of the forestry commission for the year ending 30th June, 1917. 20 p. Sydney, 1918.

Quebec—Dept. of lands and forests. Report for the twelve months ending 30th June, 1917. 133 p. tables. Quebec, 1917.

FOREST AESTHETICS

Holmes, J. S. Roadside trees in North Carolina. 8 p. Chapel Hill, N. C., 1918. (North Carolina-Geological and economic survey. Press bulletin No. 162.)

FOREST EDUCATION

Forest schools

India—Imperial forest college, Dehra Dun. Calendar, 1916. 110 p. Calcutta, 1917.

FOREST BOTANY

Maiden, J. H. The forest flora of New South Wales, pt. 62. 37 p. pl. Sydney, Govt. printer, 1918.

Navarro de Andrade, Edmundo and Vecchi, Octavio. Les bois indigenes de Sao Paulo. 376 p. il. S. Paulo, 1916.

FOREST INFLUENCES

Lin, Dau-Yang. Forests and Chihli floods. 13 p. Nanking, China, 1918.

SILVICULTURE

Planting and nursery practice

Navarro de Andrade, Edmundo and Vecchi, Octavio. Os eucalyptos, sua culturay exploracao. 228 p. il. S. Paulo, Typographia Brazil de Rothschild and comp., 1918.

FOREST PROTECTION

Diseases

Committee on the suppression of the pine blister rust in North America. White pine blister rust. comp. by Harris A. Reynolds. 40 p. n. p., 1918.

Fire

California—State board of forestry. Handbook of forest protection, 1918. 106 p. map. Sacramento, 1918.

Kennebec valley protective association. Sixth annual report, 1917. 18 p. Bingham, Me., 1917.

FOREST MANAGEMENT

Jones, Richard Chapin. Farm forestry in Virginia. 60 p. Charlottesville, Va., 1917. (Virginia-State forester. Bulletin no. 12.)

FOREST ADMINISTRATION

U. S.—Dept. of agriculture—Forest service. April field program, 1918. 31 p. Wash., D. C., 1918.

U. S.—Dept. of agriculture—Forest service. The use book; a manual of information about the national forests, 1918. 168 p. Wash., D. C., 1918.

FOREST UTILIZATION

MacKaye, Benton. Suggestions for marketing small timber. 32 p. il., map.

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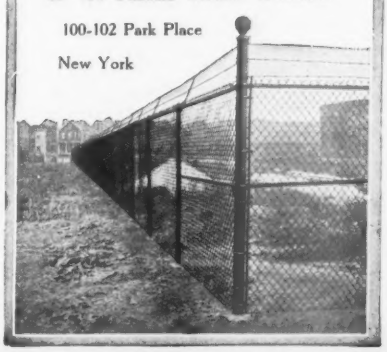

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Madison, Wisc., 1918. (Wisconsin-State conservation commission. Bulletin 4.)

Lumber industry

Smith, Franklin H. and Pierson, Albert H. Production of lumber lath and shingles in 1916. 43 p. Wash., D. C., 1918. (U. S.—Agriculture, Dept. of —Bulletin 673.)

Wood-using industries

Missouri—Fuel administration—Wood fuel committee. Burn wood and save coal to win the war. 2 p. Jefferson City, Md., 1918.

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United States—War Dept.—Signal office.

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Information for inspectors of airplane wood, prepared at the Forest products laboratory, Forest service, U. S. Dept. of Agriculture. 72 p. il., pl., diagrs. Wash., D. C., 1918.

WOOD PRESERVATION

Teesdale, Clyde H. and McLean, J. D. Relative resistance of various hardwoods to injection with creosote. 36 p. il., pl. Wash., D. C., 1918. (U. S.—Dept. of Agriculture. Bulletin 606.)

AUXILIARY SUBJECTS

Conservation of natural resources

American scenic and historic preservation society. Twenty-second annual report. 816 p. pl. Albany, N. Y., 1917.

Governors' conference. Proceedings of the 8th meeting, held at Boston, Mass., Aug. 24-27, 1915. 307 p. Madison, Wisc., 1915.

Botany

Lewis, I. F. The vegetation of Shackleford bank. 40 p. pl. Raleigh, 1917. (N. C.—Geological & economic survey. Economic paper no. 46.)

PERIODICAL ARTICLES

Miscellaneous periodicals

Aerial age, April 22, 1918—The artificial seasoning of wood, by Percy Groom, p. 307-9.

Aviation, April 15, 1918—The use of cork in aeronautics, by Arthur K. Barnes, p. 369-70; The largest cut-up plant in the world, by J. Frederick Thornel, p. 380-2.

Boletin de la Union Panamericana, March, 1918—La lucha contra los incendios de bosques en los Estados Unidos, p. 353-60.

Botanical gazette, April, 1918—The ray system of quercus alba, by La Dema

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M. Langdon, p. 315-23; Growth of trees in sphagnum, by George B. Rigg, p. 359-62.

California fish and game, April, 1918—Conservation of forests increases game, by George W. Courtright, p. 74-5.

Cut-over lands, April, 1918—Address before the annual convention of the Southern pine association, by Clement S. Ucker, p. 7-10; Little economies in land clearing, and need of the woodlot, by J. Crow Taylor, p. 13-14; A type of modern stump puller, p. 17.

Gardener's chronicle, April 27, 1918.— A veteran ahuacate tree, by F. W. Popenoe, p. 179.

Journal of the New York botanical garden, January, 1918—The relatives of catalpa trees in the West Indies, by N. L. Britton, p. 6-9.

Munsey's magazine, May, 1918—The shipbuilding problem, by Edward N. Hurley, p. 721-30.

New country life, May, 1918—Removing tree stumps, by D. Leonard Bastin, p. 80 b.

New Zealand journal of agriculture, March, 1918—The Waipoua kauri forest; its demarcation and future management, by D. E. Hutchins, p. 136-41.

Outer's-recreation, May, 1918—Restocking national forests with elk, by Aldo Leopold, p. 412-15.

Realty, March, 1918—Shipbuilding along the Gulf coast, by Charles N. Crowell, p. 8-9.

Science, May 10, 1918—The effect of cattle on the erosion of canyon bottoms, by James Terry Duce, p. 450-2.

Scientific American, March 30, 1918—Bridging the Atlantic with ships, by Edward N. Hurley, p. 304-5; Distilling municipal gas from wood, p. 333-4.

Scientific American supplement, March 2, 1918—The technical history of the airplane, by F. M. Green, p. 230-1.

Scientific monthly, April, 1918—A national park policy, by Frank A. Waugh, p. 305-18.

Trade journals and consular reports

American lumberman, April 20, 1918—Lumber and the war, by J. J. Donovan, p. 36-7.

American lumberman, May 11, 1918—Uses of wood in building construction, by the National fire protection association, p. 40-1.

Canada lumberman, April 15, 1918—Holds premier position as roof covering, p. 42.

Engineering and contracting, April 24, 1918—Are wooden ships economic, can they be improved, and are they needed? p. 398; Durability of untreated piling above mean low water, by Mabel E. Thorne and Clyde Harry Teesdale, p. 405-8.

Engineering and contracting, May 1, 1918—Specifications for pitch paint coat method of wood block pavement construction, p. 433.

Engineering news-record, April 25, 1918—Wooden floors on highway bridges are now obsolete, p. 817-18.

Journal of electricity, April 15, 1918—Substitute for cedar poles, by L. M. Klauber, p. 397-9.

Journal of industrial and engineering chemistry, May, 1918—Toluol from spruce turpentine, by A. S. Wheeler, p. 359-60.

Lumber trade journal, May 1, 1918—Red gum as a material for use in ship construction, p. 21-2.

Lumber world review, April 25, 1918—Wood preservation; a valuable aid in promoting lumber sales, by Kurt C. Barth, p. 29-31.

Metallurgical and chemical engineering, April 1, 1918—Toluol from sulphite wood-pulp, p. 338.

New York lumber trade journal, May 15, 1918—A tree felling mahcine, p. 36.

Pioneer west lumberman, April 15, 1918—An analysis of Uncle Sam's shipbuilding program, by Edward N. Hurley, p. 12-17.

Pioneer western lumberman, May 15, 1918—Building Uncle Sam's wooden merchantmen, by Frank G. Carpenter, p. 15-19.

Pulp and paper magazine, February 28, 1918—A review of pulp and paper manufacturing in Canada, p. 206-11.

Pulp and paper magazine, March 7, 1918—Fuel resources of Canada with reference to the pulp and paper industry, by B. F. Haanel, p. 225-8.

Pulp and paper magazine, March 14, 1918—Water powers of Canada, by A. M. Beale, p. 247-50.

Pulp and paper magazine, March 21, 1918—Remarks on the supply of pulpwood, with discussion, by R. H. Campbell and others, p. 269-75.

Pulp and paper magazine, April 11, 1918—Recovery of spruce turpentine in the mill, by A. W. Nickerson, p. 335-8.

Pulp and paper magazine, April 18, 1918—Paper as a surgical dressing, 359-60.

Pulp and paper magazine, April 25, 1918—Absorption of water by frozen green wood as compared with that of the wet green wood, by H. N. Lee, p. 379-80 .

Southern industrial and lumber review, April 30, 1918—When America puts her trust in wooden ships, p. 20; Wooden shoes, p. 20.

Southern lumberman, April 27, 1918—American lumber in foreign lands; Peru, p. 30.

Southern lumberman, May 4, 1918—American lumber in foreign lands; Venezula and Colombia, p. 32.

Southern lumberman, May 11, 1918—American lumber in foreign lands; Brazil, p. 42.

Southern lumberman, May 18, 1918—The "honey" quality of wood, by King H. Pullen, p. 34; American lumber in foreign lands; Argentina and Uruguay, p. 42.

Timber trade journal, March 30, 1918—A

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tree for planting in Wales, by A. P., p. 454; The acoustic properties of forestry, by Herbert Stone, p. 455-6; Remedies for neglected forestry, by Tom Bruce Jones, p. 478-9.

Timber trade journal, April 20, 1918—Wood distillation, p. 571-2.

Timber trade journal, April 27, 1918—Pitch pine and its substitutes, by W. S., p. 579.

Timberman, April, 1918—Revised specifications for aircraft material, p. 33; Work of forest regiments, by H. S. Graves, p. 36-7; Manufacturing fir masts and spars by machinery, p. 42; An object lesson in forest fire prevention, by A. G. Jackson, p. 43; El cedra colorado, p. 44. El pinabete Sitka, p. 44; Donkey engines in Bermuda, by F. A. Leete, p. 63; Motor truck in logging industry, by H. H. Harwood, p. 74, 76; Douglas fir; advantages and handicaps, by G. M. Duncan, p. 87-8.

Timberman, May, 1918—Sawn spruce displaces rived aircraft stock, p. 36-7; Kauri gum industry of New Zeland, by R. P. Grenville and others, p. 38.

United States daily consular report, April 20, 1918—Demand for lumber in the Azores, by John Q. Wood, p. 275-7.

United States daily consular report, May 2, 1918—Spanish market for paper and paper pulp, by Ely E. Palmer, p. 436-7.

United States daily consular report, May 3, 1918—Exports of dyewoods from Jamaica, by Ross Hazeltine, p. 454-5; Brazil to encourage the planting of eucalyptus, by Richard P. Momsen, p. 456-7; Italy's after-war lumber needs, by F. T. F. Dumont, p. 460-1.

United States daily consular report, May 15, 1918—Value of wood ash as a fertilizer, by Joseph Emerson Haven, p. 613.

United States daily consular report, May 17, 1918—The match industry in Brazil, by Richard P. Momsen, p. 645.

United States daily consular report, May 18, 1918—Cultivation of balsa timber in Costa Rica, by Stewart E. McMillan, p. 669-71.

United States daily consular report, May 20, 1918—Quebracho extract in Argentina and Paraguay, by Robert S. Barrett, p. 682-3.

United States daily consular report, May 21, 1918—Victorian hardwoods, p. 691.

Veneers, May, 1918—Finishing natural wood surfaces, by A. Ashmun Kelly, p. 15-16; The economies of veneering, by L. K. Stark, p. 19-20.

West Coast lumberman, May 1, 1918—Seattle shoe factory utilizes red alder, by Bror L. Grondal, p. 21, 32.

Wood turning, May, 1918—Wood fastenings and handles, p. 20-1.

Wood-warker, April, 1918—The building of wooden ships by William Jackson, p. 26-9; Conserving wood by preservatives, by Lee Prior, p. 44.

Wood-worker, May, 1918—The world's largest airplane spruce mill, by J. F. T., p. 45.

Forest Journals

American Forestry, May, 1918—Making the fir fly, by James A. Preston, p. 261-265; The war mystery, p. 266; With the forest regiments in the field., p. 267-271; The development of logging operations, by Hu Maxwell, p. 272-279; Trees from Pennsylvania for desolated France, p. 279; Heroic women in France by Dr. Alonzo Taylor, p. 280; The diurnal birds of prey-Hawks, eagles and vultures, by A. A. Allen, p. 281-284; Minnesota State forests, by W. T. Cox, p. 285-288; Flowers of late spring and early summer, by R. W. Shufeldt, p. 289-294; The way of Japanese Nimrods, by Gayne T. K. Norton, p. 295-296; Use of the range expands to meet war conditions, p. 296; The man with the thousand-year tree garden, by Frank A. Arnold, p. 297-298; Louisiana forestry law goes into effect, p. 298; The roselle plant, by H. E. Zimmerman, p. 299; New York state encourages planting, p. 299; Restoring a colonial house, by Rawson W. Haddon, p. 300-303; American foresters in military service, p. 305-310.

Australian forestry journal, April, 1918—Wooden ships to save England, p. 18-19; Notes on forest tree planting, by Walter Gill, p. 36-7; Forest trees of Queensland; red cedar, p. 38-9; Eucalyptus oil, p. 39-40.

Canadian forestry journal, April, 1918—New silver from old stumps, by James Lawler, p. 1627-9; Logging by elephants in Burma, p. 1630-1; The fuel value of wood, by W. B. Campbell, p. 1632-3; The practical application of scientific forestry, by R. O. Sweezey, p. 1638-40; The forests of Alberta and the public welfare, p. 1643-4; Forests and civilization, by Ellwood Wilson, p. 1647-8.

Indian forester, February, 1918—A study of labour conditions in a U. P. plains division, p. 45-52; Rate of growth of bamboos, by B. B. Osmaston, p. 52-57; Field investigation of spike disease in sandal on the Kollimalai hills, by M. Rama Rao, p. 58-65; Spiked sandalwood, by C. M. Hodgson, p. 66-71; Artificial propagation of sandal, by L. P. Mascarenhas, p. 72-4; Jap lumber resources, by T. Sington, p. 79-85.

Ohio Forester, April, 1918—The wood fuel campaign in Ohio, by A. E. Taylor, p. 19-21; Wood fuel notes, by J. W. Calland, p. 21-3; The fuel situation, by Edmund Secrest, p. 24-7; The production and use of fuel wood, by Edmund Secrest, p. 27-30; Comparative fuel value of wood and coal, p. 30.

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For announcement giving complete information and list of alumni, address

FILIBERT ROTH

Revue des eaux et forests, February 1, 1918—Les transports en foret et l'enseignement de la guerre, by J. Demorlaine, p. 32-40; Culture des resineaux dans les forests devastees par la guerre, by A. Jolyet, p. 25-31.

BOOK REVIEWS

A splendid little publication has just been issued by the California Redwood Association and devoted to the use of Redwood on the farm. The caption of the book is "California Redwood on the Farm." It is printed in color and is a splendid companion piece for the beautiful interior trim book of the same association. The book contains 40 pages and is profusely illustrated with some splendid examples of practically every feature of Redwood.

The Brown Brethren, by Patrick MacGee, Geo. H. Doran Company, New York City. The London Bookman says of it: "A remarkable book, a thrilling, brutal, beautiful picture of life—and death—with the rank and file at the fighting front, by a widely recognized genius who has seen much of the hardest business over there. The author pulls at our heart-strings all the while, and we find illimitable pathos and we feel illimitable love for the character of our most humorous and endearing Allies, the London Irish."

DRAINING A CYPRESS BRAKE

In Cassidy's Bayou Drainage District near Lyon, Mississippi, it became necessary to drain a large cypress brake. To do it called for a ditch 1400 feet long. Labor was scarce and wages high so Lemar Fontain, C. E., decided to try the new method of ditching with dynamite. The work was done in the winter when the weather was comparatively cold. The soil was the Delta buckshot, which was so sticky and waxy that it would have been necessary to use shovels to remove it from the scrapers if it had been decided to try to dig the ditch with teams and scrapers.

The blasting experiment was entirely successful and when completed, the ditch was of the following approximate dimensions: 6 feet wide at bottom; deepest cut, 9½ feet; shallowest cut, 3½ feet. The ditch had a 1 to 1 slope. The average cost per yard was 9 cents. Many clods of soil nearly 4 feet in diameter were thrown out. This indicates the stiffness and stickiness of the soil. This sort of ditch is now being used in this locality for laterals leading into dredge canals employed to drain brakes. A very large amount of this kind of work remains to be done in Mississippi, Arkansas, Missouri, Iowa, Louisiana, Illinois, and Indiana. The method above described should, therefore, be of interest to land owners and contractors in these states.

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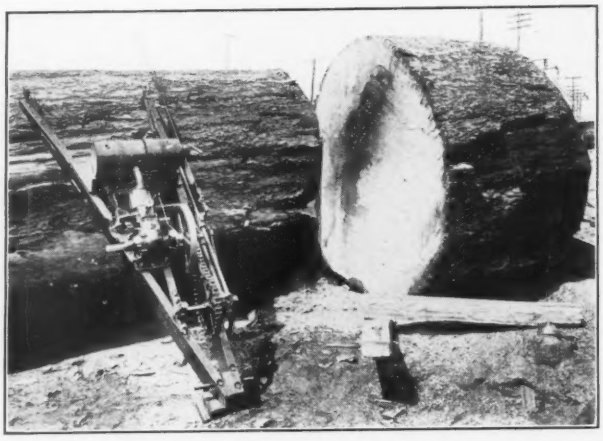

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

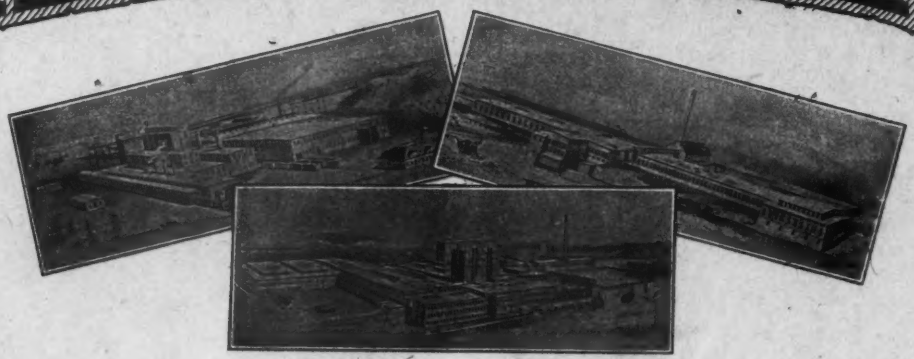
Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.



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